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This contract conducted investigations to determine the reliability with which an expanded Salmonella mutagenesis test system can distinguish between those organic chemical substances that cause cancer in laboratory animals (presumptive carcinogens*) and those that do not (noncarcinogens). The results of such tests of 100 organic compounds (50 presumptive carcinogens and 50 noncarcinogens) are described.

In general, the results indicate that the Salmonella mutagenesis system that has been employed in these tests can be used to distinguish, with a high degree of reliability, between presumptive carcinogens and noncarcinogens, in populations of test samples in which these two classes of compounds occur in approximately equal proportions. The results also show that the statistical reliability of the test system needs to be improved for the purpose of applying it to environmental samples in which the proportion of active substances (i.e., presumptive carcinogens) may be relatively low. Certain of the results indicate what steps need to be taken to achieve this improvement.

* We reserve the use of the word "carcinogens" for those substances which are known to cause cancer in people; a "presumptive carcinogen" is a substance known to cause cancer in laboratory animals.

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April 1976

RELIABILITY OF BACTERIAL MUTAGENESIS TECHNIQUES TO DISTINGUISH CARCINOGENIC AND NONCARCINOGENIC CHEMICALS

By

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16. Abstracts

The purpose of these investigations was to determine the reliability with which an expanded Salmonella mutagenesis test system can distinguish between those organic chemical substances that cause cancer in laboratory animals (presumptive carcinogens) and those that do not (noncarcinogens). Tests of 100 organic compounds (50 presumptive carcinogens and 50 noncarcinogens) have been completed. The results of these tests are described in this report.

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I. INTRODUCTION

The purpose of these investigations was to determine the reliability with which an expanded Salmonella mutagenesis test system can distinguish between those organic chemical substances that cause cancer in laboratory animals (presumptive carcinogens*) and those that do not (noncarcinogens). As required by the contract, we have completed such tests of 100 organic compounds (50 presumptive carcinogens and 50 noncarcinogens). The results are described in this report.

In general, the results indicate that the Salmonella mutagenesis system that has been employed in these tests can be used to distinguish, with a high degree of reliability, between presumptive carcinogens and noncarcinogens, in populations of test samples in which these two classes of compounds occur in approximately equal proportions. The results also show that the statistical reliability of the test system needs to be improved for the purpose of applying it to those populations of environmental samples in which the proportion of active substances (i.e., presumptive carcinogens) may be relatively low. Certain of the results indicate what steps need to be taken to achieve this improvement.

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*We reserve the use of the word "carcinogens" for those substances which are known to cause cancer in people; a "presumptive carcinogen" is a substance known to cause cancer in laboratory animals.

II. THE SALMONELLA TEST SYSTEM

GENERAL FEATURES

The mutagenesis test system which we have employed is based on procedures originally developed by Ames, et al., and makes use of Ames' special strains of Salmonella typhimurium.[1] These strains have a histidine-negative genome (and therefore are unable to grow unless histidine is supplied) and include other genetic factors that render them specially sensitive to chemical mutagenesis. One of Ames' strains (TA 1535) is designed to detect mutations due to base-pair substitutions and therefore tends to respond selectively to mutagens such as alkylating agents. Two strains (TA 1538 and TA 1537) detect frameshift mutations; TA 1538 responds particularly well to a number of carcinogens such as 2-nitrosofluorene; TA 1537 responds to carcinogens such as 9-aminoacridine. Each strain also includes in its genome mutations that greatly increase its overall sensitivity to mutagens: one of these causes loss of the DNA excission repair system and the other the loss of the lipopolysaccharide barrier that coats the surface of the bacteria (thus enhancing the penetration of large molecules). Strain TA 100, derived from TA 1535, contains an R Factor plasmid, which increases its response to certain mutagens; this strain has a rather high rate of spontaneous mutation.

Mutation causes the bacteria to revert to a histidine-positive genome (i.e. the mutant bacteria can now synthesize histidine) and can therefore be detected by the growth of colonies when they are inoculated on a nutrient medium that lacks histidine. Most carcinogenic organic compounds are not mutagenic toward Salmonella unless they are converted to an active metabolite, for example, an hydroxylated derivative. In the original Ames method this was accomplished by incorporating a preparation of rat liver microsomes in the test culture plate. We have extended the system by testing each sample with microsome preparations from seven different rat tissues, in the expectation that some presumptive carcinogens might be more effectively activated by the microsomes from some tissue other than liver. It was also known from the work of Ames and others that the dose-response curve of the Salmonella test is not linear; the mutation rate often exhibits a maximum at a particular mutagen concentration, with higher concentrations tending to be toxic. Accordingly, it is necessary to test a presumptive carcinogen over a rather wide range of concentrations.

It was our purpose to design an extended version of the original Salmonella test that, based on a suitable combination of the foregoing parameters, would optimally distinguish between presumptive carcinogens and noncarcinogens. Accordingly, each substance was tested against four different Salmonella strains (TA 1535, TA 1537, TA 1538 and TA 1536 or TA 100) at three different concentrations, with microsome preparations from seven different rat tissues (and in the absence of any microsome preparation). From these data, and suitable controls, it was possible to determine how the results obtained from the two classes of substances were affected by these parameters and to determine what combinations of conditions optimized the distinction between the two classes.

METHODS

Tester Strains

The tester strains, upon receipt from Dr. Ames' laboratory, were grown in nutrient broth and 0.8 ml. of each of the resultant cultures was mixed with .07 ml. of dimethylsulfoxide, in a 2 ml. sterile glass screw-capped vial and stored at -80°C. This served as the master copy of the strain. The inocula were prepared from streak plates on nutrient agar, incubated at 37°C for 48 hours (and then stored at 4°C). A single colony from the plate was inoculated into 5 ml. of nutrient broth and incubated overnight at 37°C, with shaking. Aliquots of this culture were used for the test plates. Fresh cultures for the test were made at least once a week and kept in the refrigerator until ready to use. A streak plate was prepared from each liquid culture as a means of propagating the strain.

Microsome Preparations

Male Wistar rats (200-250 g.) were maintained on Purina laboratory chow. Five days before sacrifice their drinking water was made to 0.1% in sodium phenobarbital, to induce microsome production. The rats were sacrificed by decapitation and the tissues were immediately removed and placed in a sterile, ice-cold beaker. The tissue microsome (S-9) fraction was prepared according to the procedure of Garner, et al.,[2] using a Potter-Elvehjem apparatus with a Teflon pestle for homogenation and a Lourdes centrifuge (LRA-1) for centrifugation of the homogenate (10 minutes at 9,000 x g). Aliquots of the resultant supernatant (the S-9 fraction) were distributed in 2-3 ml. portions in small plastic tubes, quickly frozen in dry ice, and stored at -80° C in a Revco freezer. The preparation was thawed as required; it was maintained at 0°C during preparation of the plates and any unused portion discarded. Protein determinations of typical S-9 preparations from different tissues are reported in Table 1.

For use on the test plates, the S-9 mixture was prepared to contain, per ml., the following: 0.3 ml. S-9 fraction, 8 μ moles $MgCl_2$, 33 μ moles KCl, 5 μ moles glucose-6-phosphate, 4 μ moles NADP, and 100 μ moles sodium phosphate (pH 7.4). The various stock solutions were either prepared in sterile water or autoclaved, as appropriate. The biochemical agents were stored at -20°C and inorganic solutions at refrigerator temperature. The S-9 mixture was freshly prepared each day and kept at 0°C before use.

Stock Solutions of the Test Compound

Ten mg. of the test compound was dissolved in 10 ml. of dimethylsulfoxide (DMSO). Two successive 10-fold serial dilutions in DMSO were prepared, so that 0.1 ml. of each of the solutions contained 100, 10 and 1 μg of the compound respectively. Stock solutions were coded, so that the substances were tested blind, in that the personnel who counted the plates were unaware of the classification of the compound being tested.

The Mutagenesis Test

The general procedures are those reported originally by Ames, et. al.[1] Petri plates (Lab Tek 88 mm. sterile, disposable) were prepared with approximately 30 ml. of sterilized minimal glucose agar medium. (One liter of the minimal glucose agar medium contains 13 gm. Sigma No. A-7002 agar, 20 gm. glucose, 13.12 gm. $K_2HPO_4 \cdot 3H_2O$, 3.5 gm. $NaNH_4HPO_4 \cdot 4H_2O$, 2 gm. citric acid monohydrate, and 0.2 gm. $MgSO_4 \cdot 7H_2O$.) The plates were stored at room temperature until used (usually for no more than a few days).

Top agar (0.6% Difco agar, 0.5% NaCl) was prepared, autoclaved and stored in 100 ml. bottles at room temperature. Before use the agar was melted and 10 ml. of a sterile solution of 0.5 mM L-histidine·HCl and 0.5 mM biotin added. (The trace of histidine in the top agar supports several bacterial divisions, usually a necessary prerequisite for mutagenesis.)

To prepare the mutagenesis plate, there is added to 2 ml. of molten top agar (45°C): 0.1 ml. of the nutrient broth culture of the bacterial tester strain, the test sample, and if

Table 1

PROTEIN CONTENT OF MICROSOME PREPARATIONS
FROM DIFFERENT TISSUES

Tissue	Protein Concentration (mg/ml)
Liver	15.8
Kidney	10.2
Brain	4.1
Spleen	10.3
Lung	7.8
Stomach	2.5
Blood	67.2

necessary 0.5 ml. of a given S-9 mixture (in that order). The contents are mixed in a 5 ml. tube by means of a Vertex mixer, and poured on a minimal-glucose-agar plate. The covered plate is then tilted and rotated to spread the top agar and allowed to harden for several minutes. Within an hour thereafter the plates are incubated at 37°C in the dark for 48 hours. The mutant colonies are counted by means of a Quebec colony counter. For very high counts (over 1,000), an indirect count is made. Four 1 cm.^{2} sections of the plate are counted and the total number of colonies on the plate computed from the ratio of the surface area of the plate (60.8 cm.^{2}) to 4 cm.^{2}.

SELECTION OF TEST COMPOUNDS

Selection of the 100 compounds to be tested was based on the following criteria: Substances were regarded as suitable for inclusion in the list of presumptive carcinogens if published reports showed that they produced a statistically significant elevated incidence of tumors in treated groups of one or more species of laboratory animals (usually mouse or rat) when compared to control groups of animals maintained under identical conditions but not given the test compound. The final list was selected to include representatives of different classes of organic compounds; it was to some degree affected by the availability of the compounds. A list of noncarcinogens was assembled in the same way, based on reports in the literature that a given substance, when examined under the foregoing conditions, had yielded no statistically significant increase in tumor incidence in one or more species of laboratory animals. Two substances, bromobenzene and e-caprolactone, were included in the list of noncarcinogens on the basis of their classification in a National Cancer Institute list (see Appendix A, reference 4). The compounds to be tested were obtained from commercial sources or were provided through the courtesy of the National Cancer Institute. Appendix A lists the compounds and the references that provided the basis for classifying them.

SPECIFIC PROCEDURES

In what follows we describe the procedures used in testing the 100 compounds as they were exemplified by a specific substance, the presumptive carcinogen, 2-aminofluorene.

Controls

Three types of controls were run concurrently with each experimental test. In the example given in Table 2-1 the controls showed that in the absence of any other constituents, the

Table 2-1

DETAILED RESULTS OF TYPICAL CONTROL RUNS IN ABSENCE OF TEST COMPOUND

TEST COMPOUND: 2-Aminofluorene

DATE: 7/29/74

SOLVENT: DMSO

	SAMPLE				NUMBER OF REVERTANT COLONIES PER PLATE														
					TA 1535			TA 1536			TA 1537			TA 1538			No Bacteria		
	BACTERIA	TISSUE	COMPOUND	μg	A	B	Av	A	B	Av	A	B	Av	A	B	Av	A	B	Av
control runs on bacterial strains with standard carcinogens	+	-	-		22	15	19	0	0	0	13	4	9	19	19	19			
	+	-	MNNG	10	13255	18435	15845												
	+	-	ICR-191	10				1098	1088	1093									
	+	-	9-AA	100							2838	6050	4444						
	+	-	2-Nitro-F	100										8360	4800	6580			
	+	-	AAF	50										3	15	9			
	+	Liver	AAF	50										6490	11110	8800			
control runs on tissue homogenates	-	Liver	-														0	0	0
	-	Kidney	-														0	0	0
	-	Brain	-														0	0	0
	-	Spleen	-														0	0	0
	-	Lung	-														0	0	0
	-	Stomach	-														0	0	0
	-	Blood	-														0	0	0
	-	-	Cofactors														0	0	0
	-	-	Test Cmpd														0	0	0
control runs on bacterial strains + tissue homogenates	+	Liver	-		14	10	12	0	0	0	11	3	7	20	16	18			
	+	Kidney	-		28	8	18	0	0	0	9	16	13	25	10	18			
	+	Brain	-		9	20	15	0	0	0	2	10	6	15	21	18			
	+	Spleen	-		13	16	15	1	1	1	4	6	5	19	7	13			
	+	Lung	-		16	14	15	2	0	1	11	8	10	17	25	21			
	+	Stomach	-		19	24	22	0	0	0	6	7	7	13	9	11			
	+	Blood	-		13	18	16	0	0	0	8	5	7	29	17	23			
	+	-	Cofactors		12	6	9	0	0	0	4	7	6	19	8	14			

Table 2-2

DETAILED RESULTS OF A TYPICAL EXPERIMENTAL RUN

TEST COMPOUND: 2-Aminofluorene

SOLVENT: DMSO

DATE: 7/29/74

SAMPLE				NUMBER OF REVERTANT COLONIES PER PLATE											
BACTERIA	TISSUE	COMPOUND	µg	TA 1535			TA 1536			TA 1537			TA 1538		
				A	B	Av	A	B	Av	A	B	Av	A	B	Av
+	-	+	100	5	6	6	0	0	0	15	6	11	91	104	98
+	-	+	10	8	16	12	0	0	0	10	0	5	23	32	28
+	-	+	1	12	9	11	2	0	1	1	10	6	15	15	15
+	Liver	+	100	17	24	22	0	0	0	16	21	19	8800	6930	7865
+	Liver	+	10	16	7	12	0	0	0	44	58	51	6105	4015	5060
+	Liver	+	1	12	5	9	0	0	0	12	8	10	990	1320	1155
+	Kidney	+	100	7	7	7	0	0	0	31	57	44	2035	3190	2613
+	Kidney	+	10	10	10	10	0	0	0	12	12	12	1595	1100	1348
+	Kidney	+	1	11	14	13	0	0	0	10	11	11	63	67	65
+	Brain	+	100	7	12	10	0	0	0	24	15	20	5115	3930	4522
+	Brain	+	10	24	11	18	0	0	0	13	13	13	3025	3080	3053
+	Brain	+	1	28	12	20	0	0	0	9	5	7	1320	1265	1293
+	Spleen	+	100	7	8	8	0	0	0	13	18	16	186	168	177
+	Spleen	+	10	10	10	10	1	1	1	8	6	7	71	57	64
+	Spleen	+	1	22	21	22	3	1	2	10	10	10	27	36	32
+	Lung	+	100	20	13	17	0	0	0	4	4	4	189	135	162
+	Lung	+	10	14	14	14	2	0	1	8	2	5	31	31	31
+	Lung	+	1	18	14	16	0	0	0	4	6	5	22	30	26
+	Stomach	+	100	12	14	13	0	0	0	7	5	6	568	452	510
+	Stomach	+	10	14	14	14	0	0	0	8	10	9	80	103	92
+	Stomach	+	1	14	10	12	0	0	0	9	9	9	25	24	25
+	Blood	+	100	40	5	23	0	0	0	9	9	9	18	20	19
+	Blood	+	10	14	14	14	0	0	0	7	6	7	8	14	11
+	Blood	+	1	16	8	12	0	0	0	5	6	6	14	14	14

four strains produced numbers of colonies ranging from 0-19 per plate (averages of two duplicate plates, A and B). This set of controls also determined the number of colonies produced by each bacterial strain in the presence of a standard mutagen (not requiring activation by a tissue extract) to which it should respond. As shown in Table 2-1, in each case more than 1,000 colonies per plate were observed, indicating that each strain was appropriately active. Finally, this set of controls shows that strain 1538 responds positively, as it should, when the presumptive carcinogen AAF, is activated by a liver preparation. Thus, these controls determine whether all four bacterial cultures exhibit both their expected spontaneous rates of mutation and their appropriate activities toward standard mutagens.

The second set of controls examines the bacterial content of the various constituents of the test system, which should be zero. The data reported in Table 2-1 show that the expected results were obtained; all of these preparations produced no colonies on the culture plates.

The third set of controls determined the effects of the various microsome preparations and of the cofactor preparation on the numbers of mutant colonies produced by the several strains. These values represent the spontaneous mutation rate plus the influence of any traces of histidine (which would stimulate the growth of nonmutant bacteria) that might be present in the microsome preparations. The control value used to compute the mutagenic activity ratio (see below) is the number of revertant colonies on the control plates (average of two plates) obtained on the same day,with the same strain and tissue preparation. As can be seen from Table 2-1 none of these control colony counts are significantly different from the background of spontaneous mutations exhibited by the bacteria alone.

Experimental Data

Table 2-2 reports the complete results of experimental runs with 2-aminofluorene. Three concentrations of the substance were tested, in the absence of any microsome preparation and in the presence of microsomal preparations from the seven standard tissue preparations. In the absence of a microsome preparation only background counts are obtained, except for 100 µgm. of 2-aminofluorene tested with strain TA 1538. This yielded a significant count, 98 colonies per plate, suggesting that the preparation of 2-aminofluorene may contain a trace amount of some directly active component, possibly the active intermediate that is formed when this substance is incubated with a microsome preparation. The table also shows that: (a) The substance (2-aminofluorene) is mutagenic only toward strain TA 1538; all other strains yield colony counts that are not significantly different from the comparable control counts. (b) Preparations of microsomes from liver, kidney, and brain are most effective in activating the substance; less activity is obtained with the stomach preparation and marginal activity with spleen and lung preparations. Blood appears to be inactive. These data are typical of a substance which is an activatable mutagen--i.e., it enhances the mutation rate only when activated by a suitable microsome preparation. According to Table 2-2, the mutagenic activity of 2-aminofluorene increases progressively at concentrations of 1, 10 and 100 µgm.

Data such as those reported in Tables 2-1 and 2-2 were obtained for each of the 100 substances that we have tested. For each compound 294 plates were counted, or a total of 29,400 plates for the total list of 100 compounds.

III. RESULTS

GENERAL

The experimental results obtained for the 50 presumptive carcinogens and the 50 noncarcinogens respectively are summarized in Appendix B. In keeping with the contract requirements, dose-response determinations were carried out for each of the 41 presumptive carcinogens and 5 noncarcinogens which showed an optimal mutagenic activity ratio of 2.0 or higher (see Table 4) in the initial test. The dose-response curves were carried out using the bacterial strain and microsomal preparation that yielded optimal activity. The results are shown in Figure 1.

For the 41 presumptive carcinogens, each of the dose-response curves shown in Figure 1-1 is indicative of a mutagenically active substance. Among the noncarcinogens Figure 1-2 shows that p-aminoazotoluene is clearly positive and benzylmercaptan, 2-methyl-N, N-dimethylaminoazobenzene and sulfaguanidine are clearly negative. Although the shape of the curve for naphthalene is somewhat similar to that yielded by an active compound, it also has to be considered negative since the number of colonies formed at the optimal concentration (30 colonies at 500 µgm) is not significantly higher than that of the control.

In the course of the tests it was observed that strain TA 1536 gave uniformly negative results with all substances. Accordingly, after consultation with the EPA project officer, it was agreed that TA 100 would be substituted for TA 1536. This action in effect removed TA 1536 from the comprehensive comparison of the parameters that influence the response of the Salmonella system to different substances. Hence, in what follows we report only the data based on strains TA 1535, TA 1537 and TA 1538. The results obtained with TA 1536 (or TA 100) are, however, reported in Appendix B.

For the purpose of quantitative evaluation of the data, the original values were entered into computer punch cards, and all numerical computations and preparations of graphs that are reported in what follows were then made by means of suitable computer programs. The raw data reported in Appendix B were also recorded by means of a computer printout.

Figure I-1

Dose Response Curves of Presumptive Carcinogens

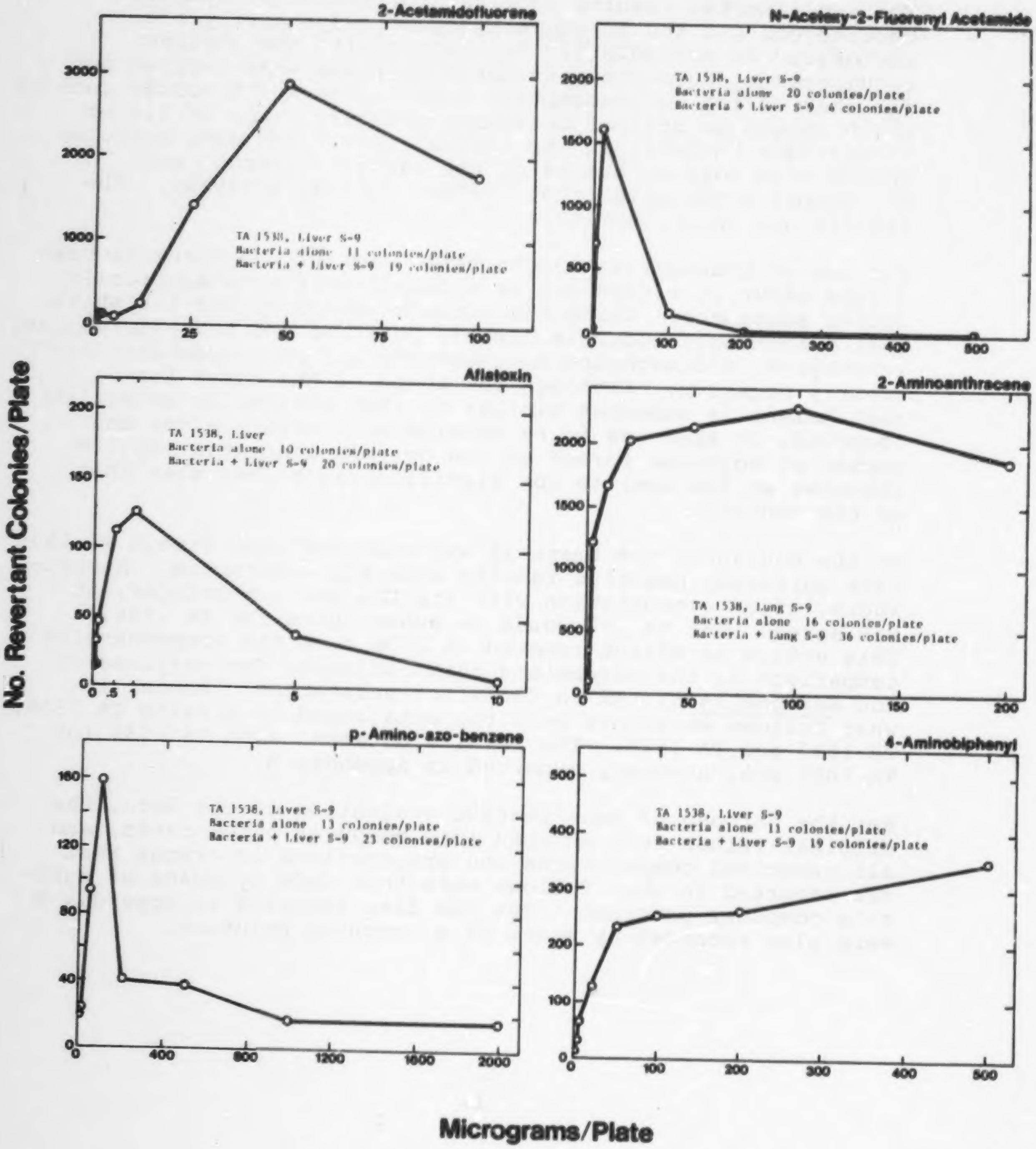

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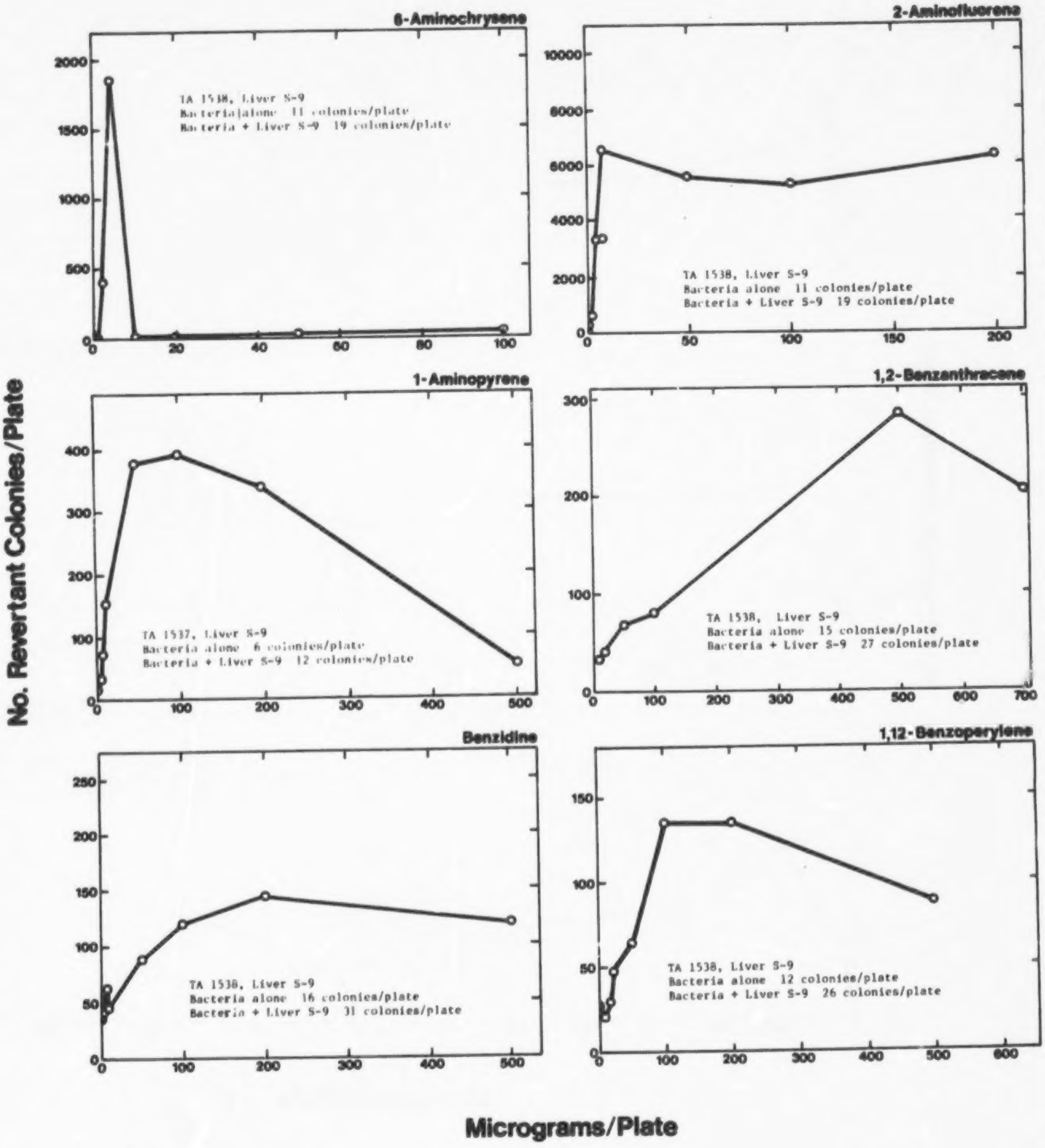
Figure I-1, continued

Dose Response Curves of Presumptive Carcinogens



6-Aminochrysene

TA 1538, Liver S-9
Bacteria alone 11 colonies/plate
Bacteria + Liver S-9 19 colonies/plate

2-Aminofluorene

TA 1538, Liver S-9
Bacteria alone 11 colonies/plate
Bacteria + Liver S-9 19 colonies/plate

1-Aminopyrene

TA 1537, Liver S-9
Bacteria alone 6 colonies/plate
Bacteria + Liver S-9 12 colonies/plate

1,2-Benzanthracene

TA 1538, Liver S-9
Bacteria alone 15 colonies/plate
Bacteria + Liver S-9 27 colonies/plate

Benzidine

TA 1538, Liver S-9
Bacteria alone 16 colonies/plate
Bacteria + Liver S-9 31 colonies/plate

1,12-Benzoperylene

TA 1538, Liver S-9
Bacteria alone 12 colonies/plate
Bacteria + Liver S-9 26 colonies/plate

Figure I-1, continued

Dose Response Curves of Presumptive Carcinogens

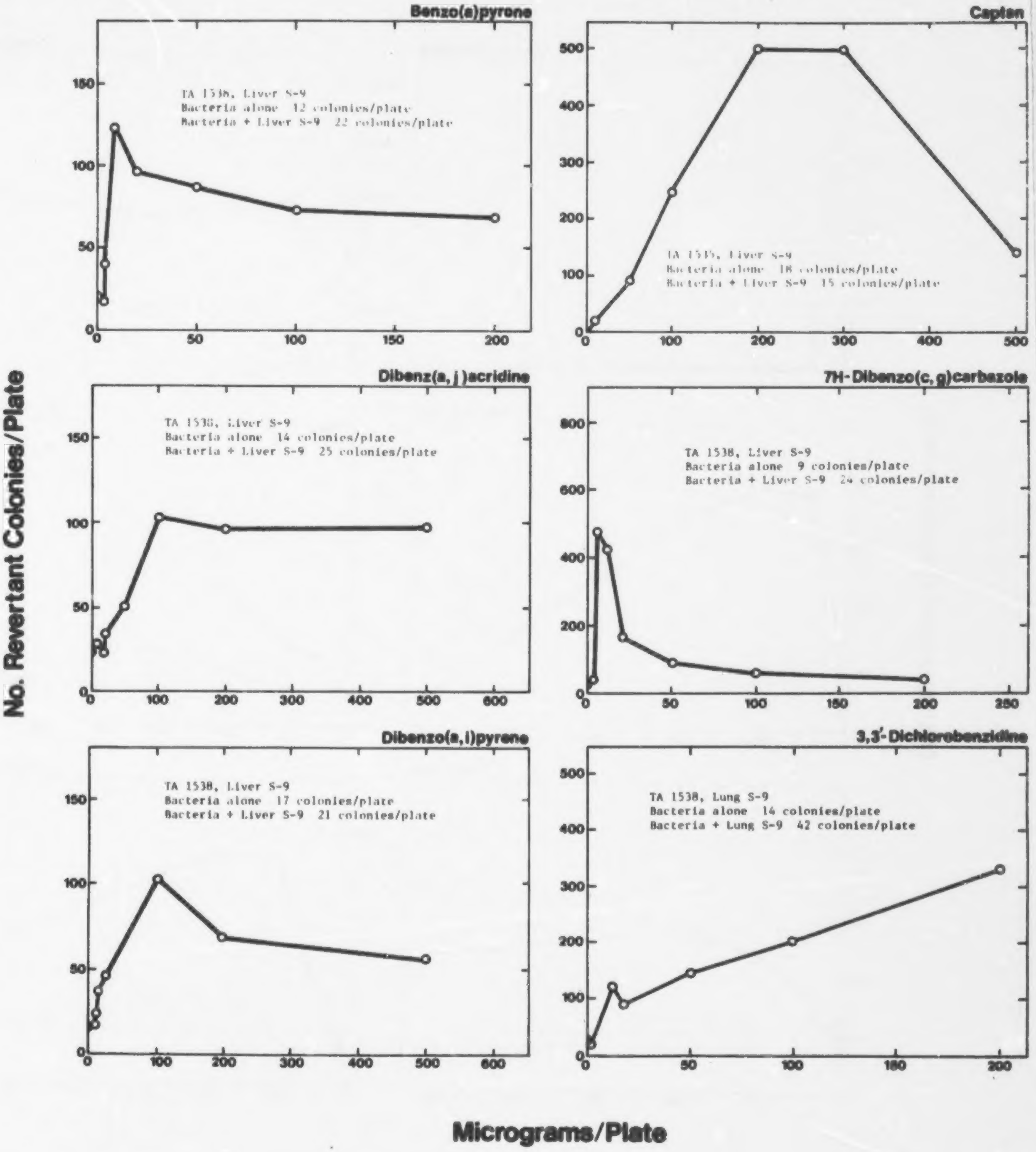


Figure 1-1, continued

Dose Response Curves of Presumptive Carcinogens

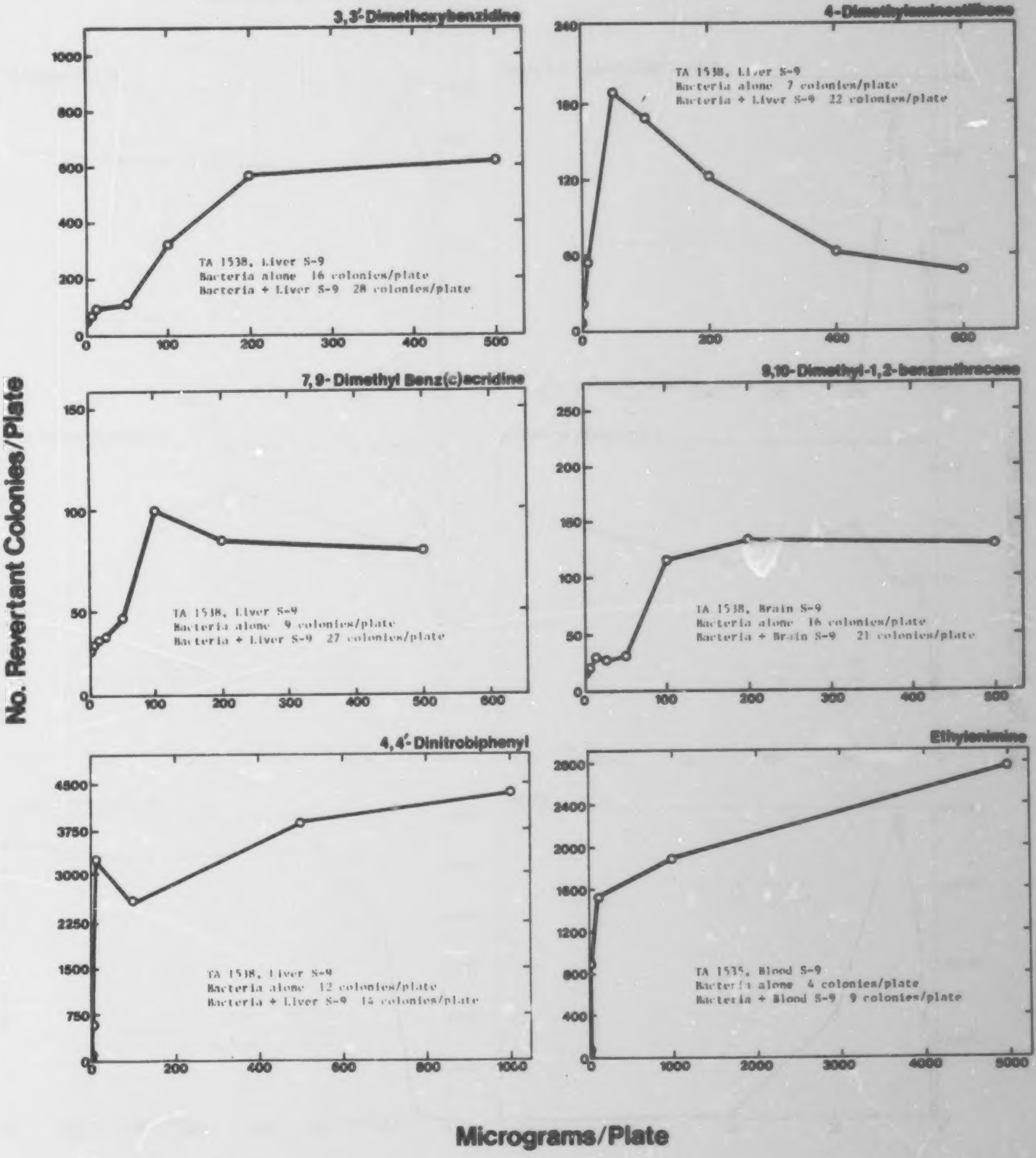


Figure I-1, continued

Dose Response Curves of Presumptive Carcinogens

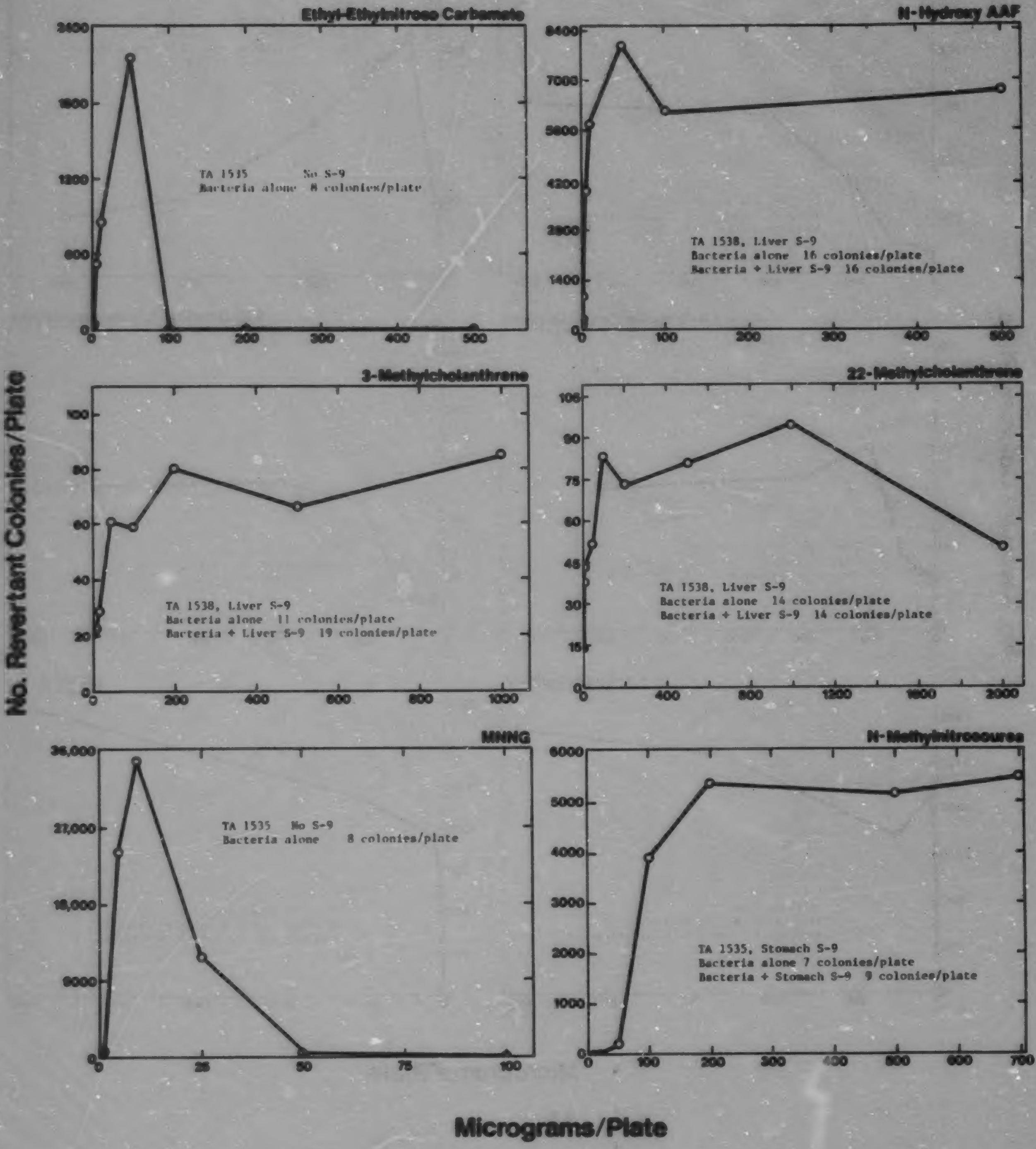


Figure I-1, continued

Dose Response Curves of Presumptive Carcinogens

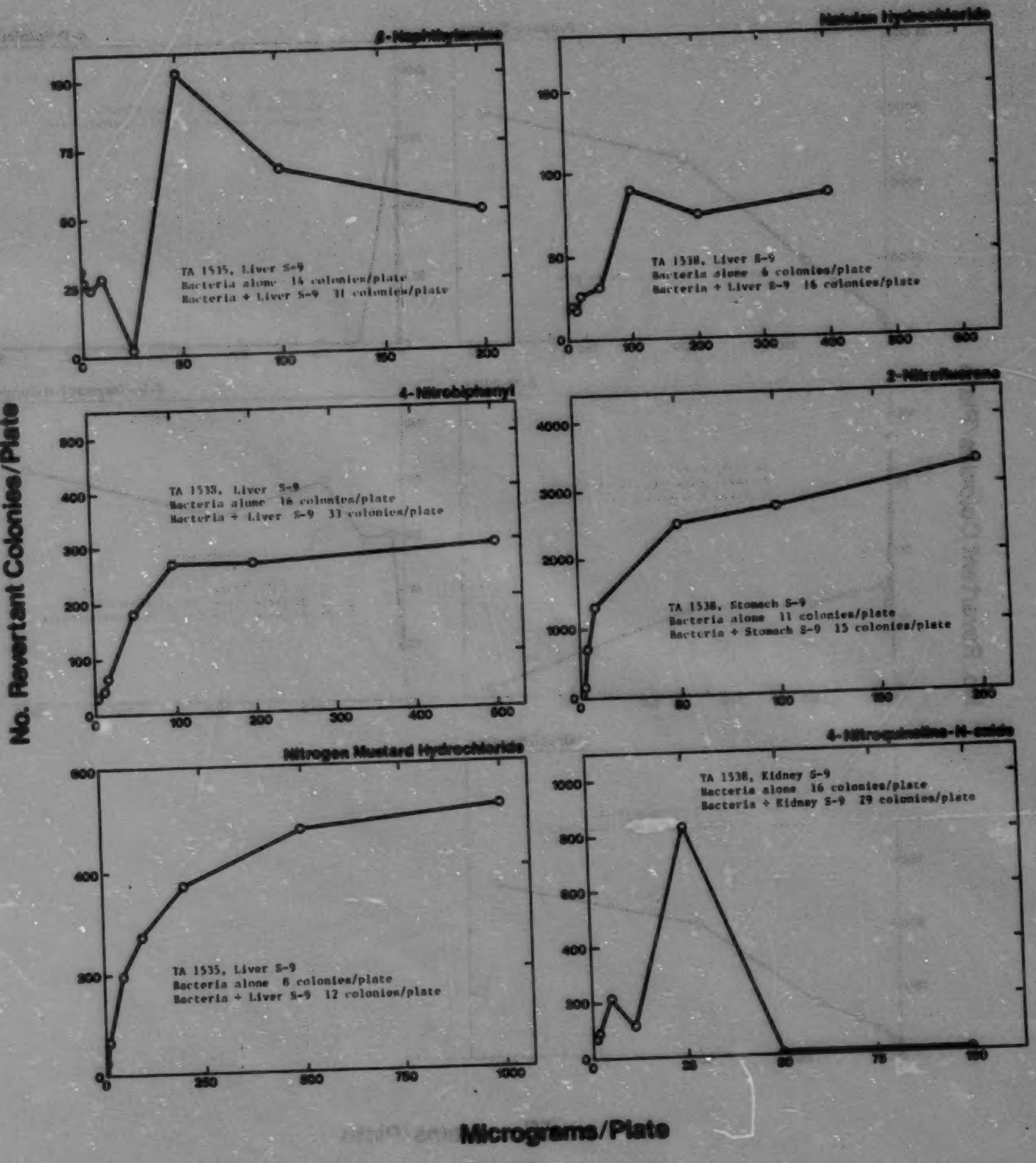


Figure 1-1, continued

Dose Response Curves of Presumptive Carcinogens

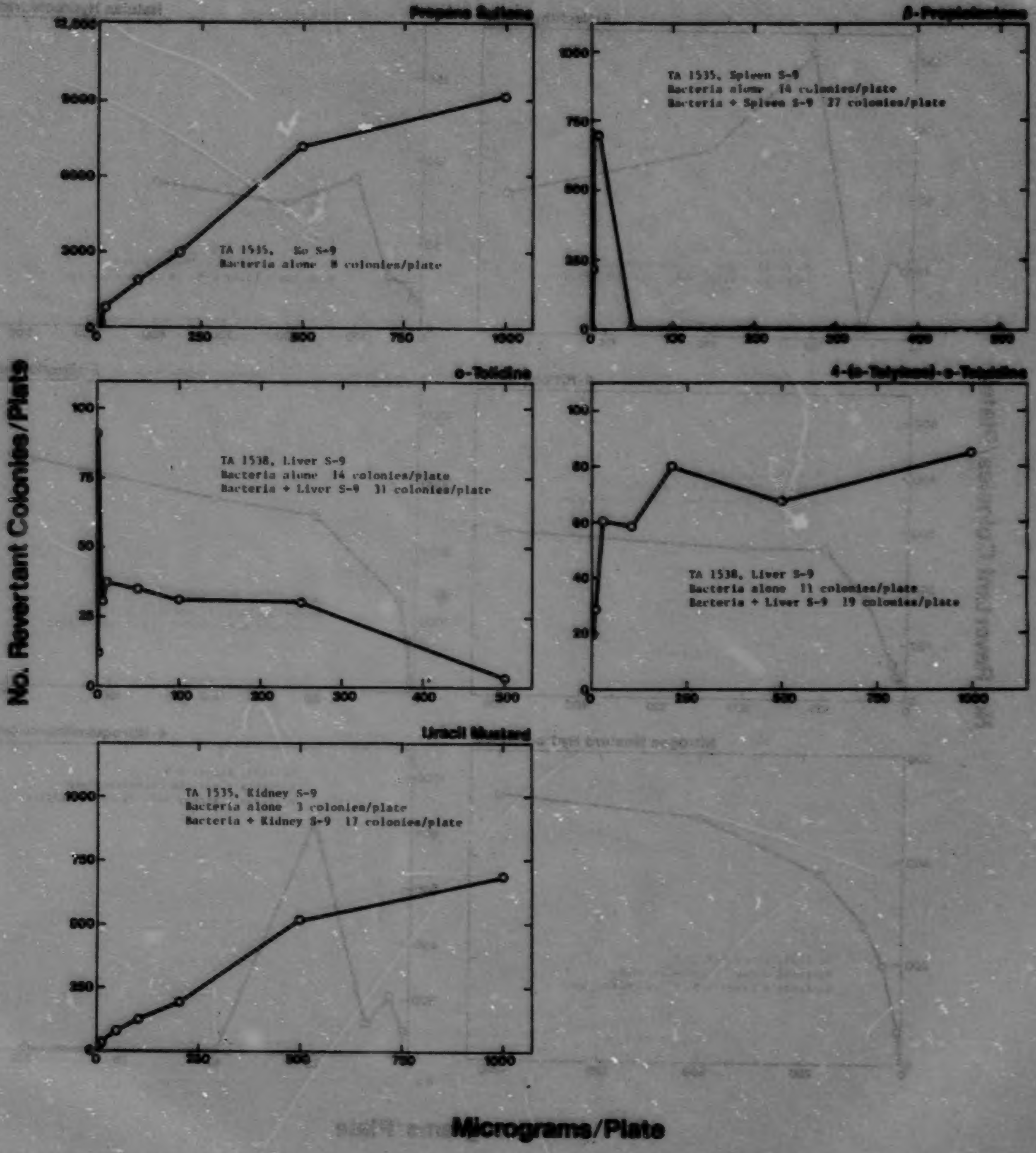
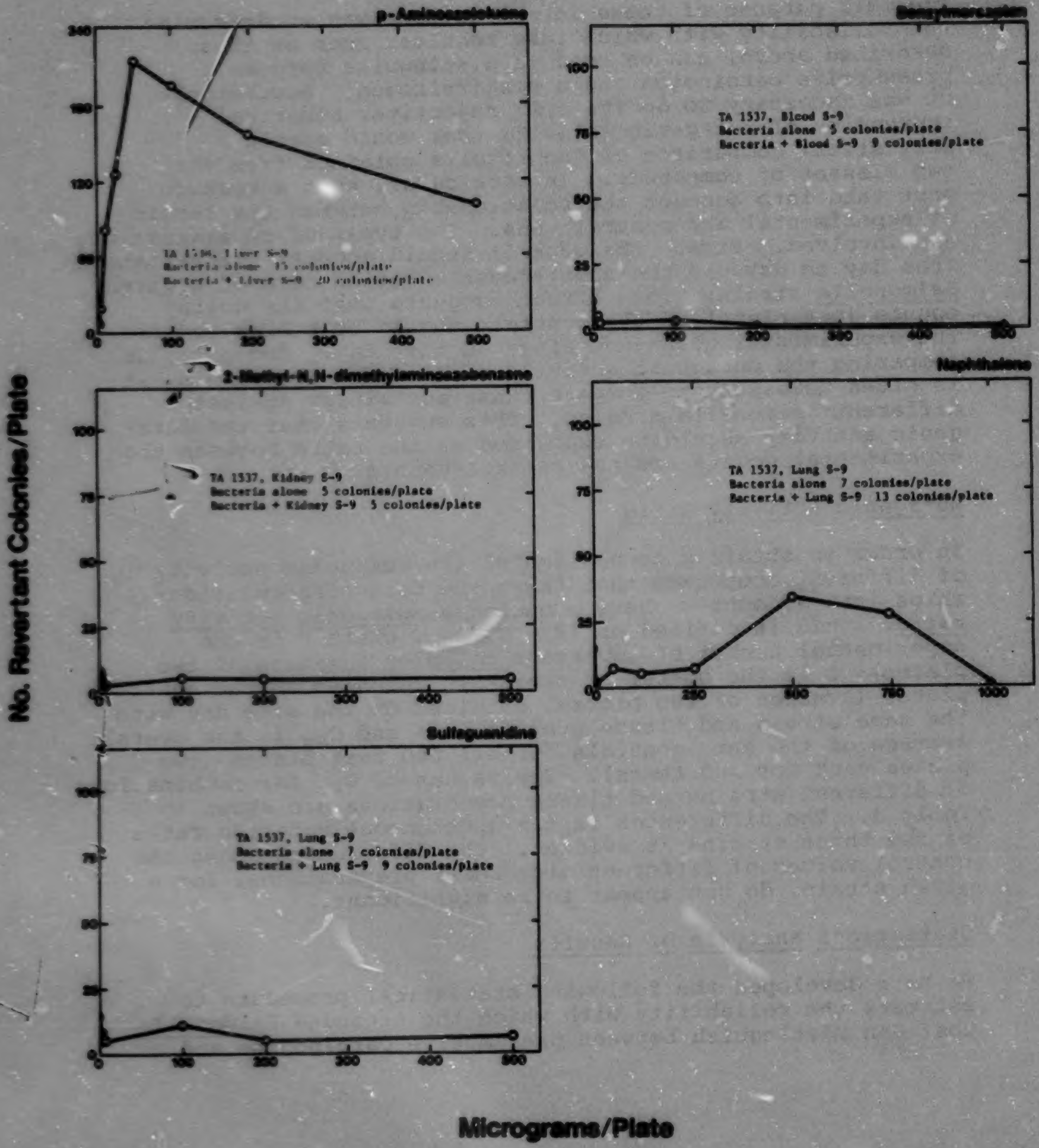


Figure 1-2

Dose Response Curves of Noncarcinogens



EVALUATION OF THE RESULTS

General

The main purpose of these investigations was to determine the reliability with which test results, such as those described above, can be used to distinguish between a presumptive carcinogen and a noncarcinogen. Accordingly, it was necessary to derive some objective, numerical expression of mutagenic activity that would enable a statistical comparison of the results obtained from the two classes of compounds. In particular, such a measure must take into account the relationship between the results of experimental and control runs. Two types of considerations are involved. First, the control should account for variations, from day to day, in the spontaneous mutation rate of a given Salmonella strain. This effect suggests that the colony counts (per plate) of the controls should be subtracted from the experimental counts obtained on that day. Secondly, in comparing the mutagenic activity of different compounds, it is often necessary to compare these activities against different Salmonella strains. This suggests that the mutagenic activity should be expressed as the ratio between the experimental counts and the control counts.

Mutagenic Activity Ratio

In order to obtain a comparison of the mutagenic activity of different compounds that takes the foregoing relationships into account we have computed a mutagenic activity ratio. This is defined as $(E - C)/C_{Av}$, where E is the experimental number of revertant colonies (average of two plates); C is the number of revertant colonies on the control plates (average of two plates) obtained on the same day with the same strain and tissue preparation; and C_{Av} is the overall average of the same controls for all 200 test plates (two plates each for 100 tests). The values of C_{Av} for combinations of different strains and tissue preparations are shown in Table 3. The differences in the spontaneous mutation rates of the three strains is evident. The differences among the control values of different microsomal preparations, for a given strain, do not appear to be significant.

Statistical Analysis of Results

We have developed the following statistical procedure to estimate the reliability with which the expanded Salmonella test can distinguish between presumptive carcinogens and

Table 3

AVERAGE NUMBER OF CONTROL COLONIES (C_{Av})
FOR DIFFERENT MICROSOME PREPARATIONS AND SALMONELLA STRAINS

(Average of 200 Test Plates Each)

	Salmonella Strain		
Microsome Preparation	TA 1535	TA 1537	TA 1538
None	9	6	13
Liver	11	9	22
Kidney	15	12	25
Brain	12	7	19
Spleen	13	9	21
Lung	13	10	19
Stomach	12	7	19
Blood	9	7	17

noncarcinogens. The procedure is based on the selection, from the full array of data obtained on each compound, of the combination of strain, tissue microsome preparation, and substance concentration which yields the highest mutagenic activity ratio, $(E - C)/C_{Av}$. In practice, as a part of the computer program used to analyse the data, the computer selected from the entire array of results that combination of parameters which yielded the highest mutagenic activity ratio and printed out both the ratio and the optimal combination of parameters. This procedure was carried out for both presumptive carcinogens and noncarcinogens.

The combination of parameters (i.e., of strains, substance concentrations, and tissue from which the microsome preparation was made) that yielded the highest mutagenic activity ratio, for each of the substances tested, is shown in Tables 4-1 and 4-2. It should be noted that this procedure selects the maximum value of both presumptive carcinogens and noncarcinogens. In the case of presumptive carcinogens the procedure has functional significance, in reflecting the combination of parameters that most enhances the mutation rate. However, in the case of noncarcinogens, the variations in the value of the mutagenic ratio are not functional, being only a reflection of the statistical fluctuations of the background count.

It will be noted from Table 4-2 that of the 50 presumptive carcinogens, three exhibited maximal mutagenic activity ratios in the absence of a microsome preparation; these are proximate mutagens that do not require activation. In some of such cases, the presence of a microsome preparation results in a reduction in mutagenic activity, apparently because the proximate mutagen is itself metabolically inactivated. (Three additional presumptive carcinogens exhibit their highest mutagenic activity ratio when no microsome preparation is present; however, in these cases the ratio is so low --usually less than 1--that the substances are obviously inactive, "false negatives.")

Table 4-2 shows that while the microsome preparation that yields the highest mutagenic activity is most often derived from liver, this is not always the case. Of the 50 presumptive carcinogens tested, 11 exhibited a maximal mutagenic activity ratio with a microsome preparation from some tissue other than liver (excluding "false negatives"). Table 4-2 also shows that the maximum ratio usually occurs with 100 µgm. of the test substance. The role of the microsomal tissue and the concentration of the test substance in governing the reliability of the test system is discussed in more detail below.

Table 4-1

MUTAGENIC ACTIVITY RATIOS OF NONCARCINOGENS

(With optimal strain, microsome preparation, and substance concentration)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
Acetaldehyde	1535	Liver	10	6	11	0.5
Acetophenone	1537	Blood	1	5	12	1.0
p-Aminoazotoluene	1538	Liver	100	30	286	12.
p-Aminobenzoic Acid	1537	Blood	100	4	7	0.4
2-Aminobiphenyl	1535	Lung	100	3	16	1.0
4-Aminosalicylic Acid	1537	Blood	1	6	11	0.7
Aniline	1537	Blood	10	6	11	0.7
Anthracene	1537	Lung	100	31	42	1.2
Antipyrene	1537	Brain	1	6	17	1.6
L-Ascorbic Acid	1537	Liver	1	8	22	1.6
Atropine Sulfate	1537	Lung	1	31	43	1.3
Atrazine	1537	None	1	3	5	0.4
Benzo-p-dioxin	1535	Liver	100	9	21	1.1
Benzoic Acid	1535	Blood	10	8	15	0.8
Benzo(e)pyrene	1535	Kidney	100	7	20	0.9
Benzylmercaptan	1537	Blood	1	9	28	2.8
Bromobenzene	1537	None	100	4	15	1.9

Table 4-1 (Continued)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
Caffeine	1537	Spleen	10	2	13	1.2
e-Caprolactone	1537	Blood	1	7	14	1.0
Coumarin	1538	Kidney	10	2	28	1.0
2,4-Dichlorophenoxyacetic Acid	1535	Brain	10	14	32	1.5
p-Dimethylaminobenzaldehyde	1538	None	1	13	27	1.1
α-Dinitrophenol	1535	Kidney	1	10	27	1.1
N,N-Dimethylformamide	1535	Liver	100	14	18	0.6
Disodium EDTA	1535	None	1	13	26	1.5
Endosulfan	1537	Liver	100	6	9	0.4
Ferbam	1538	None	100	10	24	1.0
Gibberellic Acid	1537	Lung	1	31	39	0.9
Glutathione	1537	Blood	100	2	7	0.7
Malathion	1538	Spleen	10	7	15	0.4
Methyl Carbamate	1535	Kidney	1	10	22	0.8
2,Methyl-N,N-dimethylaminoazobenzene	1537	Kidney	1	3	37	2.3
Methyl Orange	1538	Lung	10	12	41	1.5
Naphthalene	1537	Lung	100	31	50	2.1

Table 4-1 (Continued)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
2-Naphthol	1535	Brain	1	9	25	1.2
α-Naphthylamine	1537	Brain	10	1	8	1.1
p-Nitrophenol	1538	Spleen	1	21	47	1.2
d-Pantothenic Acid	1537	Stomach	100	5	12	0.9
Penicillin G	1537	Stomach	1	3	7	0.6
Pentachlorophenol	1538	Spleen	1	41	55	0.6
o-Phenylenediamine	1535	None	1	10	20	1.1
Pyridine	1537	Blood	10	3	9	0.8
Riboflavin	1538	Stomach	1	0	15	0.8
Saccharin	1537	Brain	100	11	18	1.1
Salicylic Acid	1537	Liver	10	4	10	0.7
Simazine	1537	Brain	10	3	5	0.4
cis-Stilbene	1535	Stomach	1	6	17	0.9
Sulfaguanidine	1537	Lung	1	31	55	2.5
Tetracycline	1537	None	1	6	11	0.8
Trifluralin	1535	Blood	1	3	12	0.9

Table 4-2

MUTAGENIC ACTIVITY RATIOS OF PRESUMPTIVE CARCINOGENS

(With optimal strain, microsome preparation, and substance concentration)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
Acetamide	1537	Lung	1	28	38	1.1
2-Acetamidofluorene	1538	Liver	100	25	8085	373.
N-Acetoxy-2-acetamidofluorene	1538	Liver	100	18	6981	323.
Aflatoxin-B_1	1538	Liver	1	7	1666	77.
2-Aminoanthracene	1538	Lung	100	14	4150	218.
p-Aminoazobenzene	1538	Liver	100	11	116	4.9
4-Aminobiphenyl	1538	Liver	100	18	329	14.
6-Aminochrysene	1538	Liver	1	30	1157	52.
2-Aminofluorene	1538	Liver	100	18	7865	363.
1-Aminopyrene	1537	Liver	100	15	628	70.
3-Amino-1,2,4-triazole	1537	Brain	100	4	10	0.9
Azoxymethane	1538	Stomach	1	12	24	0.6
1,2-Benzanthracene	1538	Liver	100	14	5852	271.
Benzidine	1538	Liver	100	17	275	12.
1,12-Benzoperylene	1538	Liver	100	22	134	5.2
Benzo(a)pyrene	1538	Liver	10	13	121	5.
Captan	1535	Liver	100	8	328	29.

Table 4-2 (Continued)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
Dibenz(a,j)acridine	1537	Liver	100	7	54	5.4
1,2,5,6-Dibenzanthracene	1537	Liver	10	6	16	1.2
7H-Dibenzo(c,g)carbazole	1538	Kidney	1	38	528	20.
Dibenzo(a,i)pyrene	1538	Liver	100	29	101	3.3
3,3'-Dichlorobenzidine	1538	Lung	100	16	9075	478.
3,3'-Dimethoxybenzidine	1538	Liver	100	23	165	6.6
N,N-Dimethylaminoazobenzene	1538	Kidney	10	15	33	0.7
4-Dimethylaminostilbene	1538	Liver	100	24	104	3.7
7,9-Dimethylbenz(c)acridine	1537	Liver	100	8	46	4.3
9,10-Dimethyl-1,2-benzanthracene	1538	Brain	100	18	193	9.1
4,4'-Dinitrobiphenyl	1538	Liver	100	19	800	36.
Ethylenimine	1535	Blood	100	9	4510	491.
Ethylethylnitrosocarbamate	1535	None	100	9	5005	558.
N-Hydroxyacetamidofluorene	1538	Liver	10	12	6728	311.
3-Methylcholanthrene	1537	Liver	100	11	47	4.
22-Methylcholanthrene	1538	Liver	100	14	94	3.7
N-Methylnitrosoguanidine	1535	None	100	12	50000	5585.

Table 4-2 (Continued)

Test Compound	Salmonella Strain	Microsome Preparation	Concentration µg/plate	Number of Revertant Colonies per Plate		Mutagenic Activity Ratio
				Control (C) (No Compound)	Experimental (E)	$\frac{E - C}{C_{Av}}$
N-Methylnitrosourea	1535	Stomach	100	14	2361	189.
β-Naphthylamine	1535	Liver	10	29	1059	93.
Natulan Hydrochloride	1538	Liver	100	18	83	3.0
4-Nitrobiphenyl	1538	Liver	100	15	369	16.
2-Nitrofluorene	1538	Stomach	10	15	9983	530.
Nitrogen Mustard Hydrochloride	1535	Liver	100	8	258	23.
4-Nitroquinoline-N-oxide	1538	Lung	10	9	208	11.
N-Nitrosodiethylamine	1535	None	10	5	11	0.7
N-Nitrosodimethylamine	1537	None	100	13	18	0.8
Propane Sultone	1535	None	100	11	5605	625.
β-Propiolactone	1535	Spleen	100	21	7663	594.
Safrole	1537	None	10	3	8	0.7
Thioacetamide	1537	Stomach	100	5	9	0.6
o-Tolidine	1538	Liver	100	18	80	2.9
4-(o-Tolylazo)-o-toluidine	1538	Liver	100	23	363	16.
Uracil Mustard	1535	Kidney	100	13	138	8.5

Figures 2, 3, and 4 show the frequency distributions of the mutagenic activity ratios of noncarcinogenic substances, tested with TA 1535, TA 1537 and TA 1538 and of the concurrent control plates. It is evident that in each case the frequency distribution for the noncarcinogenic substances is very similar to that of the controls. This indicates that the presence of noncarcinogens has no systematic effect on the spontaneous mutation rates of the several strains of bacteria. The differences among the spontaneous mutation rates (TA 1538, TA 1535, TA 1537) is evident in both the control plates and the experimental plates.

Figure 5 compares the frequency distribution of the mutagenic activity ratio for noncarcinogens and presumptive carcinogens, at the optimal combination of bacterial strain, microsomal tissue and substance concentration, for each substance. (This figure is a plot of the frequency distribution of the mutagenic activity ratios shown in Tables 4-1 and 4-2.) Of the 50 noncarcinogens tested, one (p-aminoazotoluene) exhibits a ratio (12) that is clearly outside the range of the ratios exhibited by the remaining noncarcinogens. Of the remaining noncarcinogens, one shows a ratio of 2.8, and one each of 2.5, 2.3 and 2.1 respectively. All the remaining ratios are 2.0 or less. As indicated by Figure 5 the preponderance of ratios lies between .5 and 2.0.

The lower panel of Figure 5 shows the frequency distribution of the mutagenic activity ratios of the 50 presumptive carcinogens. Of these substances, nine yield ratios that are below 2.0. Of the remaining 41 presumptive carcinogens 2 yielded ratios between 2.0 and 3.0 (2.9 and 3). However, the dose-response curves obtained from these substances (o-tolidine and natulan hydrochloride) which are shown in Figure 1, clearly indicate their positive mutagenic activity.

The relationship between the mutagenic activity ratios of presumptive carcinogens and of noncarcinogens is shown in more detail in Figure 6. This figure, which is based on the data of Tables 4-1 and 4-2, shows the variation of the cumulative percentage of compounds (average of two duplicate plates per compound) with mutagenic activity ratio. The cumulative curves of Figure 6 establish, quantitatively, the relationship between a given value of the mutagenic activity ratio and the reliability with which that ratio distinguishes between presumptive carcinogens and noncarcinogens. Thus the curves (triangular points) representative of the results for all 100 compounds, show that 82 percent of the presumptive carcinogens yield ratios above 1.5 and that the same percentage of noncarcinogens yield ratios below that value.

Figure 2

Frequency Distribution of Non Carcinogen and Control Plates (TA 1535; Microsomes from Various Tissues)

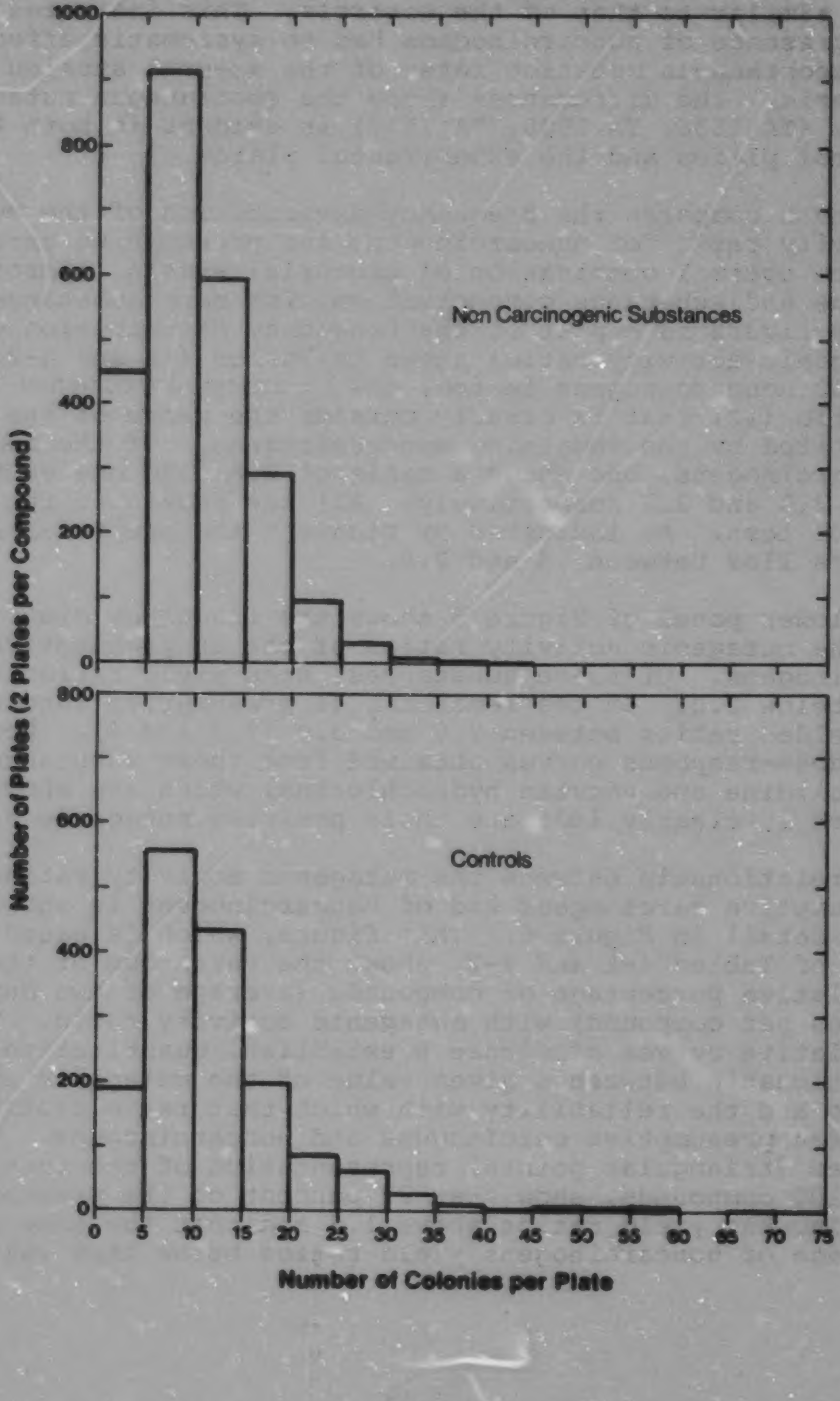
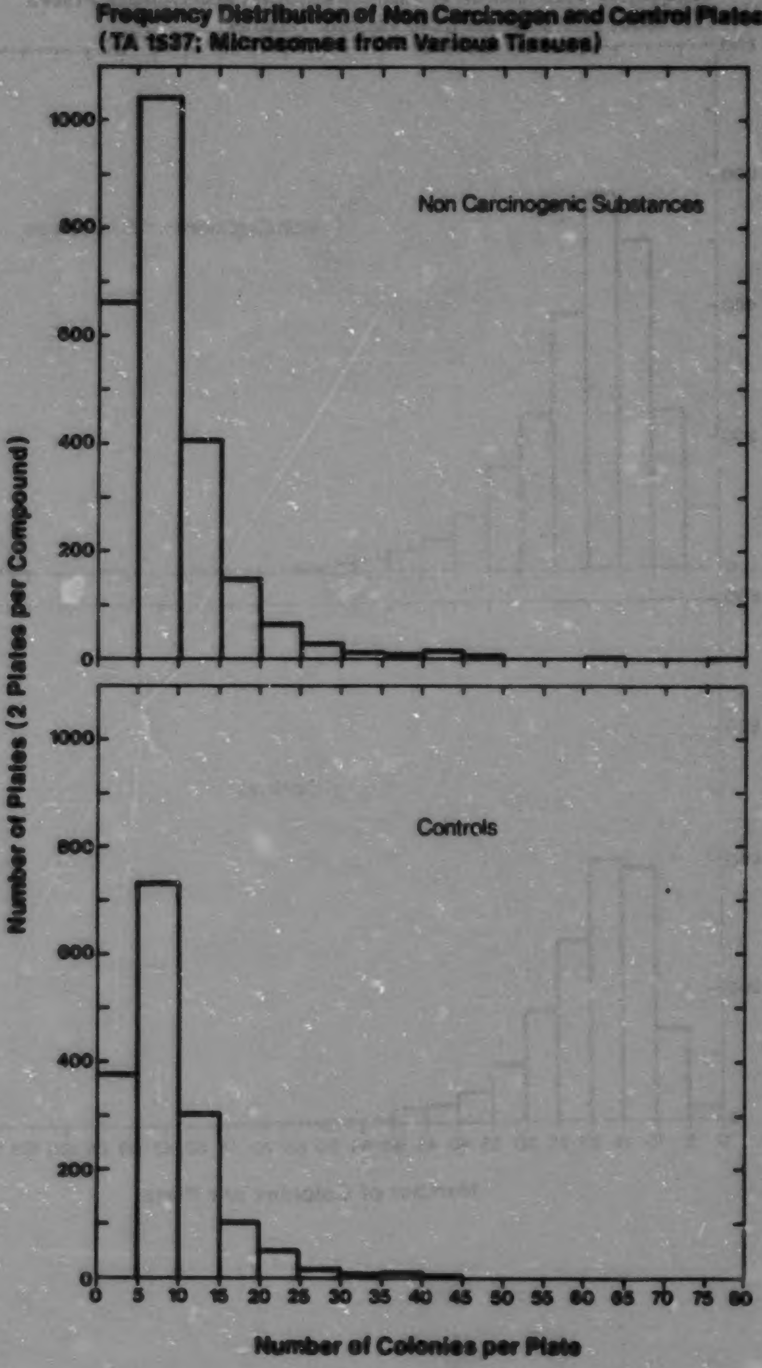


Figure 3



Frequency Distribution of Non Carcinogen and Control Plates (TA 1537; Microsomes from Various Tissues)

Figure 4

Frequency Distribution of Non Carcinogen and Control Plates (TA 1538; Microsomes from Various Tissues)

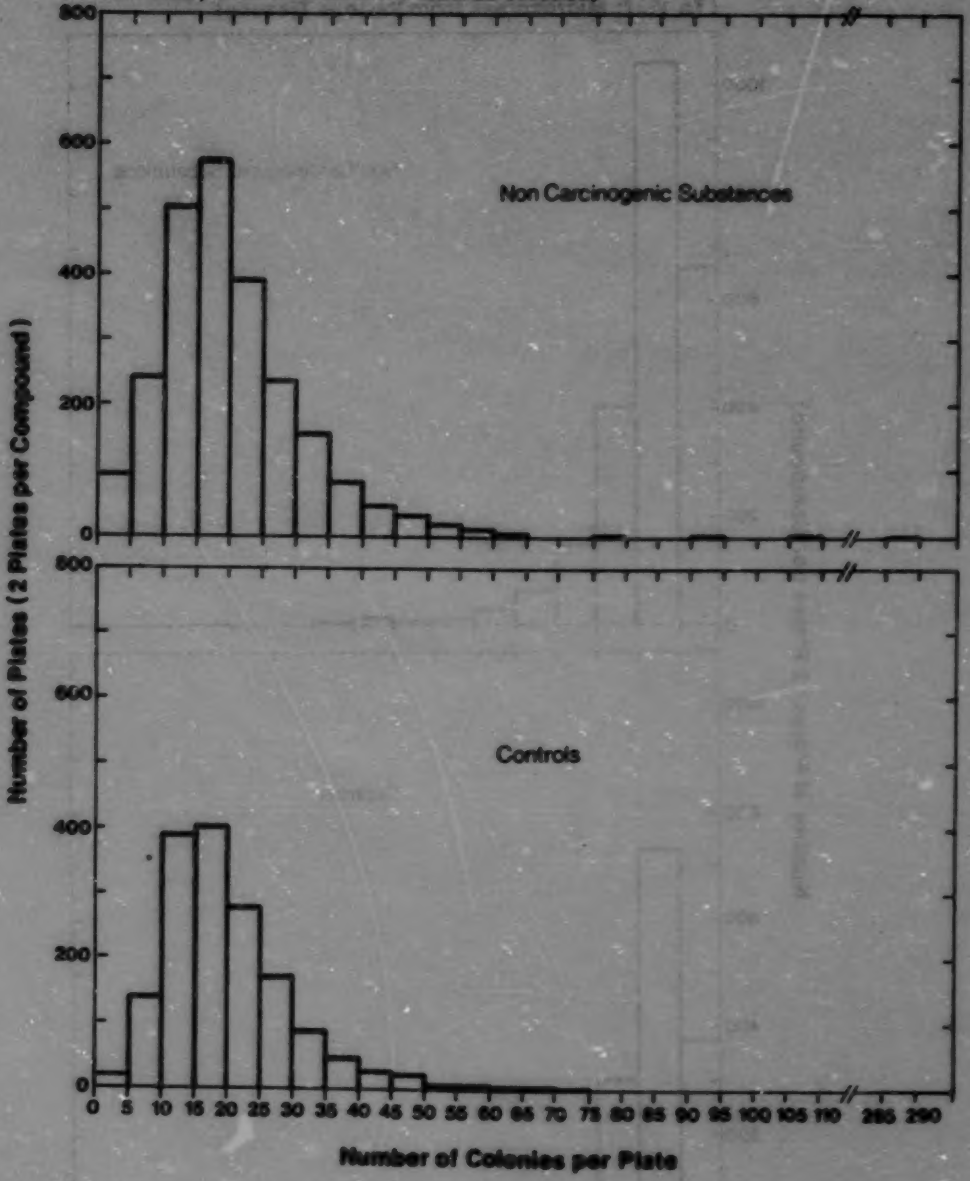


Figure 5

Frequency Distribution of Mutagenic Activity Ratios of Presumptive Carcinogens and Non Carcinogens

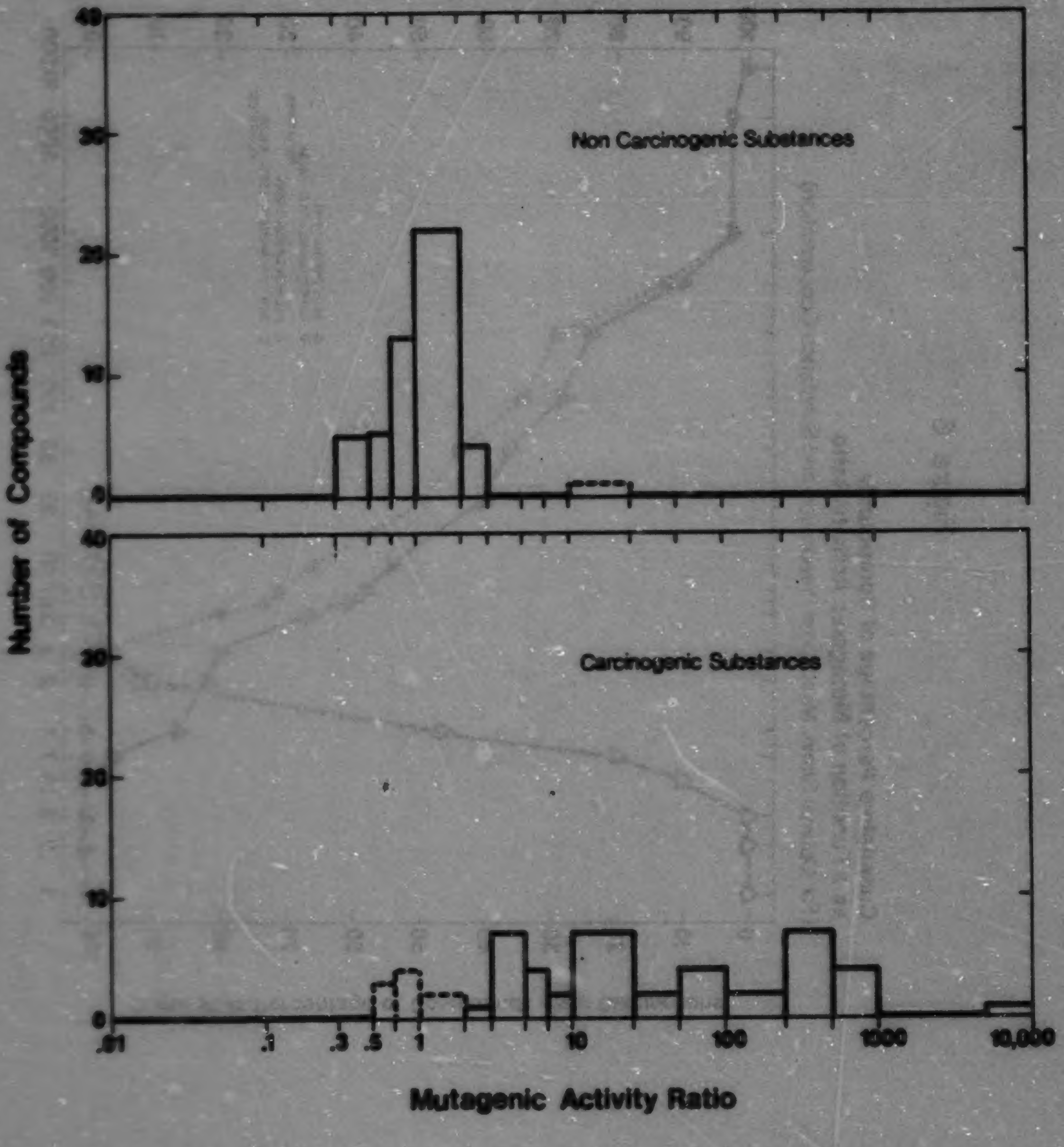
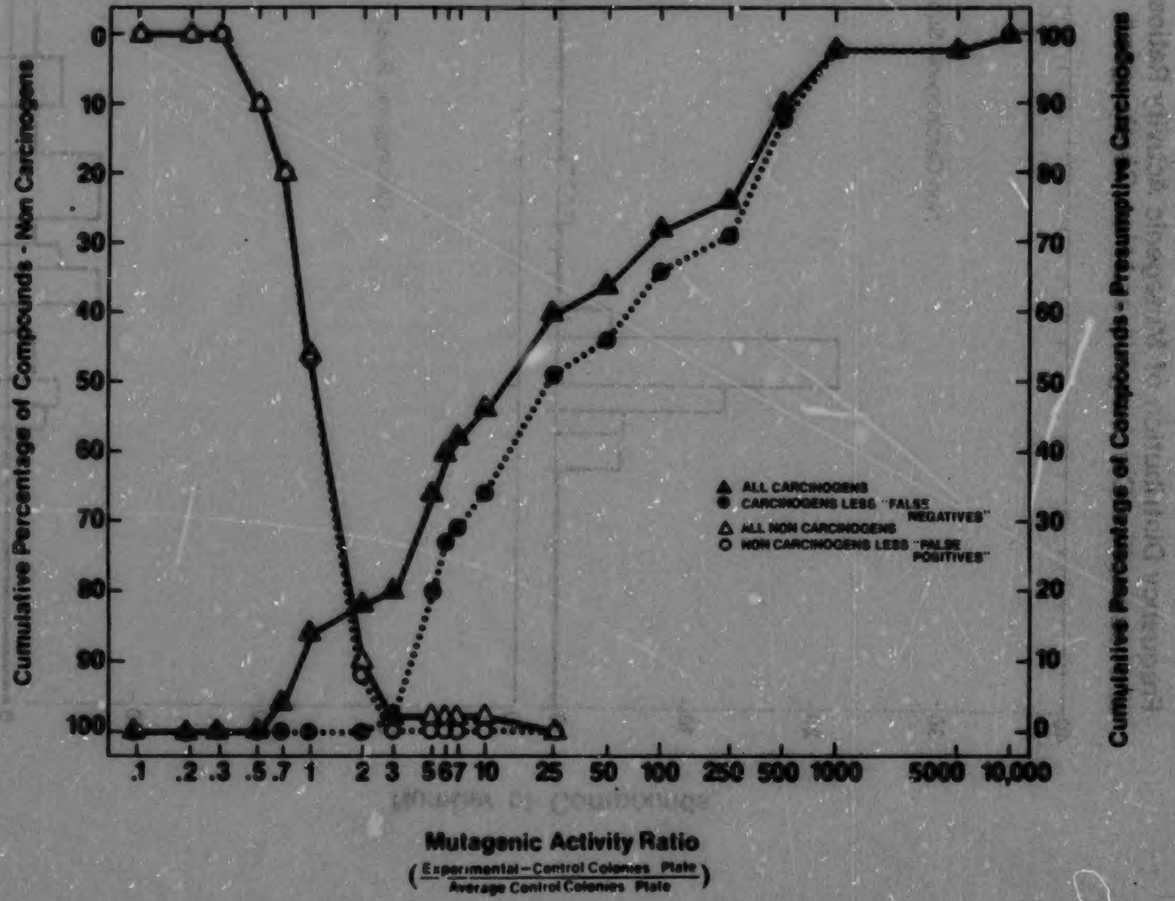


Figure 6

Cumulative Percentage of Compounds as a Function of Mutagenic Activity Ratio
(For Optimal Strain, Microsome Preparation and Substance Concentration)



In other words, if a mutagenic activity ratio of 1.5 were chosen as the cutoff point between the two classes of compounds, 82 percent of both groups would be correctly classified. At a cutoff ratio of 2.5 the reliability with which a noncarcinogen is correctly classified is improved; about 95 percent of the noncarcinogens, but only about 81 percent of the presumptive carcinogens, would then be correctly classified. Conversely, at a cutoff ratio of 0.7 the probability of correctly classifying a presumptive carcinogen is increased to about 95 percent, while the probability of correctly classifying a noncarcinogen is reduced to about 20 percent. (See Table 5.)

It is evident from the cumulative curve for presumptive carcinogens shown in Figure 6 that of the 50 compounds tested 9 are to be considered "false negatives." That is, if the mutagenic activity ratio is chosen at a value (1.5) that maximizes the percentage of the two groups (82 percent) that is correctly classified, 9 presumptive carcinogens would be classified in the noncarcinogenic group. In the case of these compounds (listed in Table 6), the conditions of the Salmonella test employed do not elicit a significant mutagenic response. However, it has been noted[3] that by slight changes in the test system (for example, by replacing DMSO with water as the solvent, and preincubation with PCB-induced liver microsome preparation) it is possible to obtain mutagenic activity for three of the false negatives (N,N-dimethylaminoazobenzene, N-nitrosodimethylamine and N-nitrosodiethylamine). Thus, by finding suitable ways of altering the test conditions it may be possible to reduce or eliminate the number of "false negatives." In this connection it is of interest to determine what overlap between the mutagenic activity ratios exhibited by the two classes of compounds would occur if it were possible, eventually, to avoid the occurrence of "false negatives" (and of the 1 in 50 "false positive"). This would indicate the inherent overlap between the results yielded by the two classes of compounds, and thus set a limit on the maximum reliability achievable. In Figure 6, the dotted lines report the cumulative results if the 9 "false negatives" and the 1 "false positive" are not considered. The two lines cross at a mutagenic activity ratio of 2.8, with a probability of correct classification of about 98 percent.

It is of interest to analyse the influence of variations in the concentration of the test substance and of the tissue from which the S-9 microsome preparation is made on the reliability of the test system. From the raw data it is possible to obtain a computer printout of the variation in

Table 5

PROBABILITIES OF CORRECTLY CLASSIFYING PRESUMPTIVE CARCINOGENS AND NONCARCINOGENS AT VARIOUS MUTAGENIC ACTIVITY RATIOS

	Probability (percent) for Different Policy Alternatives*					
	From Present Experimental Data			With "false positives" and "false negatives" eliminated		
	Set Probability I to = Probability II	Set Probability I to = 95%	Set Probability II to = 95%	Set Probability I to = Probability II	Set Probability I to = 95%	Set Probability II to = 95%
Mutagenic Activity Ratio $\frac{E - C}{C_{Av}}$	1.5	0.7	2.5	2.8	3.2	2.4
I: Probability of Correctly Classifying a Presumptive Carcinogen	82	95	81	98	95	99
II: Probability of Correctly Classifying a Noncarcinogen	82	20	95	98	99	95

*For optimal combination of tester strain, microsome preparation and substance concentration.

Table 6

PRESUMPTIVE CARCINOGENS WHICH SHOWED NEGATIVE RESPONSE* IN THE SALMONELLA TEST

("False Negatives")

1. Acetamide
2. 3-Amino-1,2,4-triazole
3. Azoxymethane
4. 1,2,5,6-Dibenzanthracene
5. N,N-Dimethylaminoazobenzene
6. N-Nitrosodiethylamine
7. N-Nitrosodimethylamine
8. Safrole
9. Thioacetamide

* Mutagenic activity ratio less than 1.5 under optimal conditions.

the cumulative percentage of test compounds with the mutagenic activity ratio separately for each of the combinations of substance concentrations and microsomal tissue, and for combinations which optimize the ratio. By superimposing the curves for presumptive carcinogens and for noncarcinogens, in the manner shown in Figure 6, one can determine the cutoff ratio at which the probabilities of correctly classifying each type of compound are equal, as well as the value of the probability of that ratio. The resultant data are shown in Table 7. Curves for different tissues, at optimal concentration (with the optimal Salmonella strain) are shown in Figure 7. Curves for the different concentrations, for optimal strain and tissue preparation are shown in Figure 8. (Figures 7 and 8 are intended to show only the region of the cutoff ratio and unlike Figure 6 do not extend over the full range of observed mutagenic activity ratios.) In both figures the curves for the optimal combination of parameters are also shown for purposes of comparison.

Table 7 leads to certain relevant generalizations about the influence of substance concentration and microsomal tissue preparation on the probability of correctly classifying the two types of compounds.

(a) In general the probability of correct classification at a mutagenic activity ratio which yields equal probabilities for the two classes of compounds increases with substance concentration. However, with the exception of kidney, lung and blood, the probability of correct classification is further enhanced if it is based on the optimal concentration--i.e., the one that yields the highest mutagenic activity ratio. This reflects the toxicity effect, which in some instances reduces the apparent mutagenic rate at high concentrations.

(b) For tests with a microsomal preparation from any single tissue, liver clearly yields the highest probability of correct classification. Of the remaining tissues, blood is essentially inactive, while kidney, lung and stomach microsome preparations yield probabilities that most closely approach that of liver alone. At concentrations of 1 µgm. and 10 µgm. per plate the liver preparation is not always optimal, so that if the test is based on the tissue preparation that yields the optimal mutagenic activity ratio, the probability of correct classification is improved somewhat. At a concentration of 100 µgm. per plate this advantage is not evident.

Table 7

PROBABILITIES OF CORRECTLY CLASSIFYING PRESUMPTIVE CARCINOGENS AND NONCARCINOGENS (WHEN THESE ARE EQUAL) AT GIVEN CUTOFF MUTAGENIC ACTIVITY RATIOS

(With Optimal Strain)

MICROSOME PREPARATION	SUBSTANCE CONCENTRATION (µgm./plate)							
	1		10		100		Optimal Concentration	
	Cutoff Ratio	Probability (%)	Cutoff Ratio	Probability (%)	Cutoff Ratio	Probability (%)	Cutoff Ratio	Probability (%)
None	.4	57	.4	62	.4	66	.7	72
Liver	.4	60	.6	77	.7	81	.8	82
Kidney	.4	60	.4	69	.3	72	.6	72
Brain	.3	58	.4	67	.3	62	.6	68
Spleen	.3	62	.4	64	.3	68	.5	70
Lung	.4	61	.4	70	.4	72	.6	72
Stomach	.3	59	.3	69	.3	70	.5	75
Blood	.3	55	.4	57	.4	59	.5	59
Optimal Microsome Preparation	.8	60	1.0	79	1.0	80	1.5	82

Figure 7

Cumulative Percentage of Compounds as a Function of Mutagenic Activity Ratio

(For Optimal Strain and Concentration)

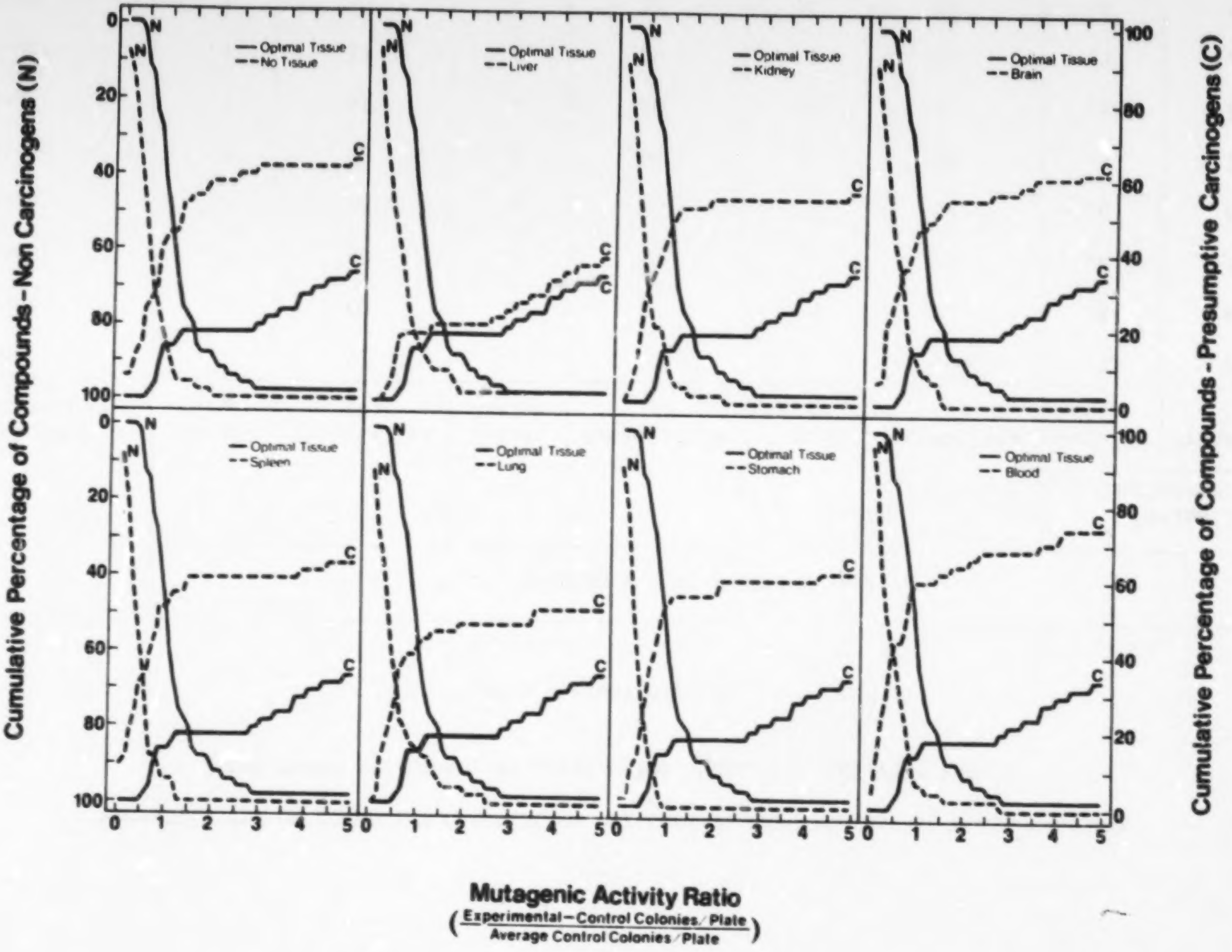
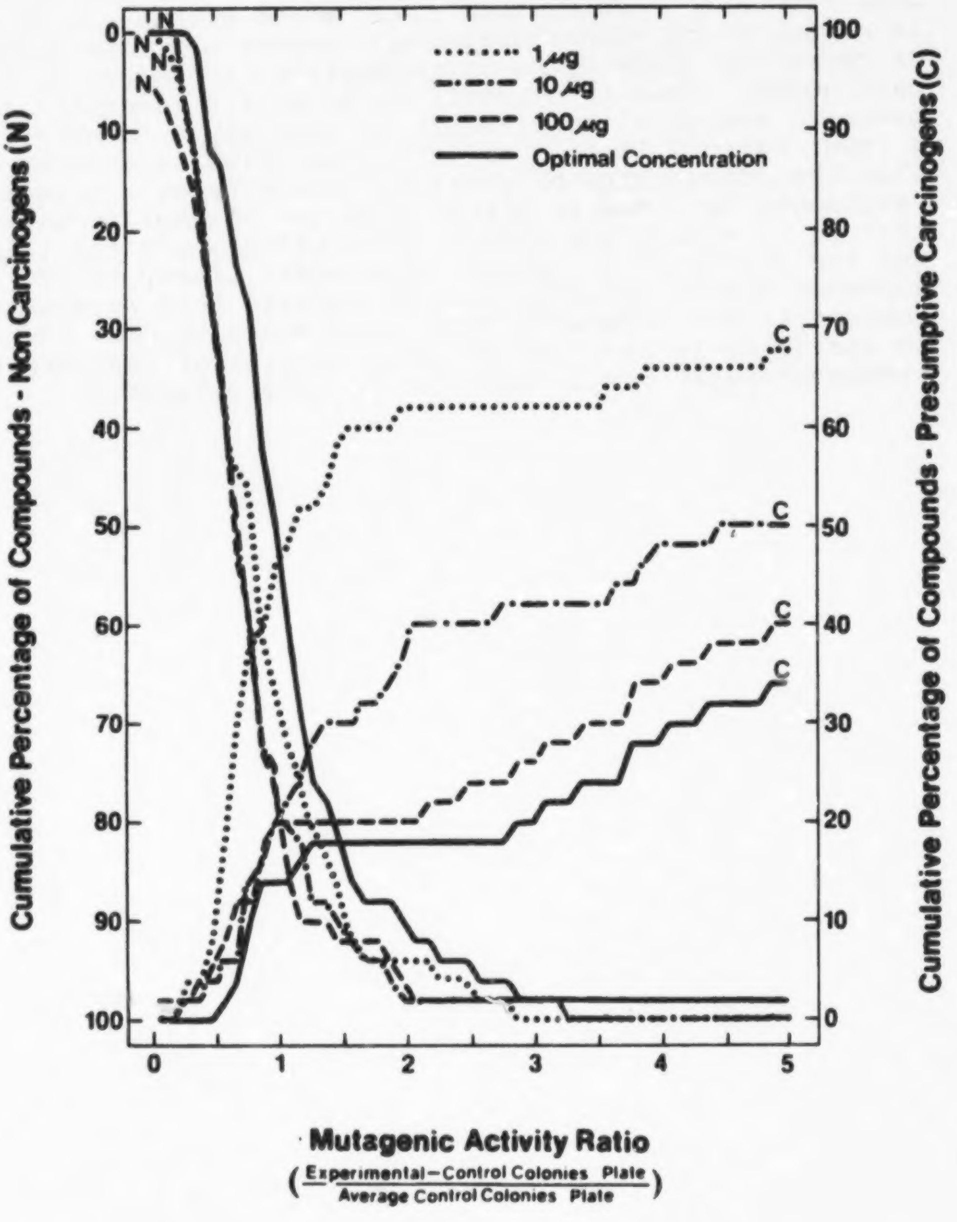


Figure 8

Cumulative Percentage of Compounds as a Function of Mutagenic Activity Ratio
(For Optimal Strain and Microsome Preparation)



(c) If one chooses an optimal combination of both concentration and microsomal tissue, the probability of correctly classifying a compound (at the mutagenic activity ratio at which both probabilities are equal) is maximal, 82 percent. This same probability can be achieved if only the liver S-9 preparation is used in the test system. However, Figure 7 shows that the optimal combination yields more favorable results than liver alone when a cutoff ratio is chosen which either maximizes, separately, the probability of correctly classifying a presumptive carcinogen or a noncarcinogen. Thus if a cutoff ratio of 3.0 is chosen in order to maximize the probability that any substance yielding a lower ratio will be correctly classified as a noncarcinogen, then the probability of correctly classifying a presumptive carcinogen is somewhat better with the optimal combination than it is with liver alone. This effect, and the tendency for the choice of an optimal microsomal tissue to yield somewhat higher probabilities at certain test substance concentrations indicates that there would be some advantage in including in the test at least several of the more active tissue preparations in addition to liver itself.

IV. DISCUSSION: APPLICABILITY OF THE SALMONELLA SYSTEM FOR TESTING UNKNOWN COMPOUNDS

We have thus far considered the reliability with which the extended Salmonella test system distinguishes between presumptive carcinogens and noncarcinogens in the actual test that we have carried out on 50 compounds of each type. In other words, the probabilities of correct classification cited above are retrospective. In effect, they describe the probability of correctly classifying any given compound, on the basis of a stated mutagenic activity ratio, if the foregoing tests were to be repeated on the same 100 compounds. If the test were to be carried out on a different group of compounds, equally divided between presumptive carcinogens and noncarcinogens, we would expect similar results provided that the number of "false negatives" in the former group were of the order of 18 percent or less.

We consider now the expected probability of correctly classifying a compound if the test were carried out with a different group of compounds in which the proportion of presumptive carcinogens is not 50 percent, but considerably less. This situation is of interest since in applying the test to a population of unknown environmental samples, the proportion of presumptive carcinogens is likely to be significantly lower than 50 percent. In such a situation it is expected that the probabilities of correctly classifying the two types of compounds will be altered in accordance with Bayes' theorem.[4] In Table 8 we compute, from the data of Table 5 and Bayes' formula, for a population of samples in which only 10 percent are presumptive carcinogens, the probability that a sample testing positive (i.e., mutagenic activity ratio is greater than the indicated cutoff ratio) is actually positive, and that a sample testing negative is actually negative. It can be seen from Table 8 that while the latter probability is 97.3 - 97.8 percent (depending on the mutagenic activity ratio chosen), the former probability ranges from 11.7 - 64.3 percent. Table 8 shows that these relatively low probabilities could be elevated to 68.8 - 91.3 percent, provided that it were possible to eliminate the "false negatives" from the test.

We conclude therefore, that the extended Salmonella test, carried out as described above, can satisfactorily distinguish between presumptive carcinogens and noncarcinogens in test populations in which the two groups of compounds

Table 8

APPLICATION OF BAYES' THEOREM

(Where Probability of Positive Sample in Test Population is 0.1)

	Probability (percent) for Different Policy Alternatives*					
	From Present Experimental Data			With "false positives" and "false negatives" eliminated		
	Set Probability I to = Probability II	Set Probability I to = 95%	Set Probability II to = 95%	Set Probability I to = Probability II	Set Probability I to = 95%	Set Probability II to = 95%
Mutagenic Activity Ratio $\frac{E - C}{C_{Av}}$	1.5	.7	2.5	2.8	3.2	2.4
Probability that a Sample Testing Positive is Actually Positive	33.6	11.7	64.3	84.5	91.3	68.8
Probability that a Sample Testing Negative is Actually Negative	97.6	97.3	97.8	99.8	99.4	99.9

Probability I = Probability of Correctly Classifying a Presumptive Carcinogen in Mutagenesis Tests.

Probability II = Probability of Correctly Classifying a Noncarcinogen in Mutagenesis Tests.

Bayes' Formula:

$$Pr(P/+) = \frac{Pr(+/P)Pr(P)}{Pr(+/P)Pr(P) + (1 - Pr(-/N))Pr(N)}$$

$$Pr(N/-) = \frac{Pr(-/N)Pr(N)}{Pr(-/N)Pr(N) + (1 - Pr(+/P))Pr(P)}$$

Where:

$Pr(P/+)$ = Probability that a sample testing positive is actually positive.
$Pr(N/-)$ = Probability that a sample testing negative is actually negative.
$Pr(+/P)$ = Probability of correctly classifying a positive sample.
$Pr(-/N)$ = Probability of correctly classifying a negative sample.
$Pr(P)$ = Probability of a positive sample in test population.
$Pr(N)$ = Probability of a negative sample in test population.

*For optimal combination of tester strain, microsome preparation and substance concentration.

occur in approximately equal proportions. However, if the test is to be equally reliable in analysing populations of samples in which the proportion of presumptive carcinogens is relatively low (of the order of 10 percent) it is important that the test procedure be modified in ways that either eliminate, or sharply reduce, the occurrence of "false negatives."

Certain results which we have obtained during studies carried out in parallel with the above suggest how the necessary improvements can be achieved. We have found that 2 of the 9 "false negatives" (N,N-dimethylaminoazobenzene and 1,2,5,6-dibenzanthracene), when fed to rats result in the appearance of mutagens in the urine that can be readily detected by means of the *Salmonella* test (see reference 5 for a description of the method and results obtained with one of these substances, DAB). Thus, if tested compounds were fed to rats, and the urine analysed for mutagens, at least two of the "false negatives" could be eliminated. Such an *in vivo* procedure is, of course, more cumbersome than the *in vitro* *Salmonella* test. However, by means of suitable investigations it might be possible to determine where, in the rat, the presumptive carcinogens are activated, and on that basis develop new *in vitro* procedures that respond to these substances.

One reason why a presumptive carcinogen may not yield a positive result in the *Salmonella* test system, as it is presently designed, is that its active metabolites may be further metabolized to an *inactive* compound on the test plate. It is now known that the crude S-9 microsome preparations that are used in the *Salmonella* test are extremely heterogeneous. Although the overall system oxidizes compounds including several presumptive carcinogens by way of the microsomal cytochrome P-450 system, it is clear that various types of cytochromes occur which differ in their substrate specificities. Accordingly, it is likely that the metabolic transformations that occur in the present *Salmonella* system involve more than a simple activation of the presumptive carcinogen and that additional processes may in some cases interfere with the detection of mutagenic metabolites. Analysis of this problem and the resultant refinement of the activation system, is likely to further reduce the occurrence of "false negatives" in the *Salmonella* test.

Another problem that requires further investigation is the possibility that DMSO may interfere with the activity of certain presumptive carcinogens. Preliminary studies suggest that this effect may account for at least one of the "false negatives" (N,N-dimethylaminoazobenzene).

We believe that given the results of such studies, the Salmonella test is likely to become capable of detecting presumptive carcinogens, as they occur in low frequency in populations of environmental samples, with the same, or better, reliability that it exhibits in testing populations in which presumptive carcinogens and noncarcinogens occur in equal proportions.

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   Brawnlee, K. A., Statistical Theory and Methodology in Science and Engineering, John Wiley and Sons, New York, N.Y. (1965).

5. Commoner, B., Vithayathil, A. J., and Henry, J. I., Nature, 249, 850 (1974).

APPENDIX A

The noncarcinogens and presumptive carcinogens tested are listed in Appendices A-1 and A-2 respectively.

The references that provided the basis for classification are given by numbers following the name of the compound as follows:

1. "Survey of Compounds Which Have Been Tested for Carcinogenic Activity," 7 Volumes, U.S. Dept. of Health, Education and Welfare, Publication No. 149, 1951-73.
2. "IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man," Volumes 1-9, Published by International Agency for Research on Cancer, Geneva, Switzerland, 1973-75.
3. Weisburger, J. H. and Weisburger, E. K., Chemical and Engineering News, 44, 124 (Feb. 1966).
4. "List of Compounds Selected for Mutagenicity Program," National Cancer Institute, 1972.
5. Miller, James A., Cancer Research, 30, 559 (1970).
6. Druckrey, H., and Lange, A., Federation Proceedings, 31, (1972).
7. Rosenkranz, H. S., Department of Microbiology, New York University, Valhalla, New York; personal communication.
8. Report on Trifluralin, EPA/OPP.

APPENDIX A-1

LIST OF NONCARCINOGENS TESTED

Substance	Reference
Acetaldehyde	1
Acetophenone	1
p-Aminoazotoluene	1
p-Aminobenzoic Acid	1
2-Aminobiphenyl	3
4-Aminosalicylic Acid	1
Aniline	1
Anthracene	1
Antipyrene	1
L-Ascorbic Acid	
Atrazine	1
Atropine Sulfate	1
Benzo-p-dioxin	1
Benzoic Acid	1
Benzo(e)pyrene	1
Benzylmercaptan	1
Bromobenzene	4
Caffeine	1
e-Caprolactone	4
Coumarin	1
2,4-Dichlorophenoxyacetic Acid	1
p-Dimethylaminobenzaldehyde	1
N,N-Dimethylformamide	1
α-Dinitrophenol	1
Disodium EDTA	1
Endosulfan	1
Ferbam	1
Gibberellic Acid	1
Glutathione	
Malathion	1
Methyl Carbamate	1
2-Methyl-N,N-dimethylaminoazobenzene	1
Methyl Orange	1
Naphthalene	1
2-Naphthol	1
α-Naphthylamine	1,2
p-Nitrophenol	1
d-Pantothenic Acid	
Penicillin G	1
Pentachlorophenol	1
o-Phenylenediamine	1
Pyridine	1
Riboflavin	

APPENDIX A-1

Substance	Reference
Saccharin	1
Salicylic Acid	1
cis-Stilbene	1
Simazine	1
Sulfaguanidine	1
Tetracycline	1
Trifluralin	8

APPENDIX A-2

LIST OF PRESUMPTIVE CARCINOGENS TESTED

Substance	Reference
Acetamide	1
2-Acetamidofluorene	1
N-Acetoxy-2-acetamidofluorene	5
Aflatoxin-B_1	1
2-Aminoanthracene	1
p-Aminoazobenzene	1
4-Aminobiphenyl	1
6-Aminochrysene	1
2-Aminofluorene	1
1-Aminopyrene	1
3-Amino-1,2,4-triazole	1,2
Azoxymethane	6
1,2-Benzanthracene	1
Benzidine	1
1,12-Benzoperylene	1
Benzo(a)pyrene	1
Captan	7
Dibenz(a,j)acridine	1,2
1,2,5,6-Dibenzanthracene	1,2
7H-Dibenzo(c,g)carbazole	1,2
Dibenzo(a,i)pyrene	1,2
3,3'-Dichlorobenzidine	1,2
3,3'-Dimethoxybenzidine	1,2
N,N-Dimethylaminoazobenzene	1,2
4-Dimethylaminostilbene	1
7,9-Dimethyl-benz(c)acridine	1
9,10-Dimethyl-1,2-benzanthracene	1
4,4'-Dinitrobiphenyl	1
Ethylenimine	1
Ethylethylnitrosocarbamate	1
*N-Hydroxyacetamidofluorene	5
3-Methylcholanthrene	1
22-Methylcholanthrene	1
N-Methylnitrosoguanidine	1
N-Methylnitrosourea	1
β-Naphthylamine	1,2
Natulan Hydrochloride	1
4-Nitrobiphenyl	1,2
2-Nitrofluorene	1
Nitrogen Mustard Hydrochloride	1,2
4-Nitroquinoline-N-oxide	1
N-Nitrosodiethylamine	1,2
N-Nitrosodimethylamine	1,2

APPENDIX A-2

Substance	Reference
Propane Sultone	1,2
β-Propiolactone	1,2
Safrole	1,2
Thioacetamide	1,2
o-Tolidine	1,2
4-(o-Tolylazo)-o-toluidine	1,2
Uracil Mustard	2

APPENDIX B

Appendices B-1 and B-2 show the results of the Salmonella test on noncarcinogens (NC) and presumptive carcinogens (C) respectively with microsome preparations from different tissues. In each class the compounds are listed alphabetically followed by a computer code number (e.g.; C-10 stands for presumptive carcinogen No. 10) which we have used to identify each compound. Concentrations are given in µgm. per test plate (0, 1, 10, and 100); duplicate values are shown for each of the four indicated tester strains (TA 1535, TA 1537, TA 1538, TA 1536 [or TA 100]).

APPENDIX B-1

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Acetophenone (NC-30)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	6.	5.	4.	10.	6.	18.	195.	189.
	1	8.	4.	16.	10.	16.	15.	224.	168.
	10	4.	6.	11.	7.	19.	20.	166.	172.
	100	7.	4.	4.	16.	14.	11.	238.	191.
LIVER									
	0	7.	9.	17.	14.	30.	23.	336.	228.
	1	9.	13.	15.	9.	26.	21.	140.	196.
	10	13.	12.	10.	11.	29.	23.	228.	200.
	100	12.	17.	11.	13.	20.	22.	201.	245.
KIDNEY									
	0	0.	0.	20.	12.	11.	14.	353.	355.
	1	9.	12.	16.	15.	29.	31.	337.	309.
	10	14.	11.	15.	18.	30.	33.	306.	262.
	100	7.	13.	26.	19.	30.	26.	291.	316.
BRAIN									
	0	11.	7.	8.	8.	26.	16.	197.	243.
	1	6.	0.	7.	5.	14.	18.	188.	180.
	10	4.	9.	8.	14.	11.	18.	187.	204.
	100	1.	6.	0.	10.	18.	24.	190.	201.
SPLEEN									
	0	8.	10.	7.	7.	18.	18.	249.	231.
	1	9.	5.	2.	4.	22.	17.	244.	210.
	10	7.	3.	8.	6.	15.	30.	231.	178.
	100	4.	6.	9.	5.	17.	16.	214.	200.
LUNG									
	0	5.	8.	6.	8.	18.	12.	296.	208.
	1	8.	5.	7.	8.	12.	16.	230.	200.
	10	4.	0.	5.	6.	16.	12.	239.	217.
	100	14.	7.	11.	12.	17.	12.	225.	231.
STOMACH									
	0	13.	2.	9.	8.	20.	17.	171.	253.
	1	2.	5.	6.	6.	17.	18.	214.	188.
	10	7.	9.	7.	4.	22.	18.	253.	223.
	100	4.	3.	6.	4.	16.	18.	246.	189.
BLOOD									
	0	5.	4.	7.	2.	25.	23.	243.	191.
	1	8.	0.	10.	13.	24.	27.	158.	214.
	10	10.	8.	11.	12.	35.	23.	248.	234.
	100	5.	4.	10.	6.	26.	15.	207.	227.

Acetaldehyde (NC-63)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	4.	9.	3.	6.	8.	16.	79.	83.
	1	8.	3.	9.	2.	12.	12.	88.	96.
	10	7.	6.	3.	6.	9.	14.	129.	103.
	100	1.	6.	3.	1.	10.	12.	86.	72.
LIVER									
	0	9.	3.	7.	7.	11.	17.	138.	122.
	1	7.	9.	3.	8.	5.	12.	134.	129.
	10	11.	18.	7.	11.	11.	18.	161.	93.
	100	11.	10.	10.	10.	21.	22.	93.	108.
KIDNEY									
	0	5.	5.	5.	5.	14.	13.	130.	118.
	1	5.	6.	6.	8.	12.	10.	140.	111.
	10	5.	7.	2.	7.	12.	20.	133.	159.
	100	6.	5.	5.	4.	13.	17.	126.	113.
BRAIN									
	0	9.	12.	2.	8.	10.	15.	127.	131.
	1	8.	10.	0.	8.	12.	16.	99.	119.
	10	3.	3.	6.	5.	22.	17.	89.	82.
	100	10.	7.	7.	6.	14.	13.	72.	118.
SPLEEN									
	0	3.	6.	4.	5.	19.	17.	124.	104.
	1	2.	2.	5.	3.	10.	16.	144.	123.
	10	19.	6.	3.	2.	19.	5.	133.	126.
	100	5.	3.	1.	3.	6.	18.	114.	79.
LUNG									
	0	3.	3.	0.	2.	13.	18.	83.	114.
	1	4.	9.	7.	5.	19.	12.	93.	119.
	10	9.	8.	3.	5.	22.	17.	117.	125.
	100	13.	3.	6.	4.	13.	9.	126.	103.
STOMACH									
	0	6.	9.	5.	4.	8.	9.	124.	118.
	1	5.	5.	2.	2.	9.	14.	98.	109.
	10	7.	6.	2.	5.	13.	12.	102.	116.
	100	4.	10.	4.	0.	5.	10.	102.	113.
BLOOD									
	0	9.	13.	7.	3.	16.	13.	105.	94.
	1	7.	4.	10.	0.	22.	18.	133.	102.
	10	9.	8.	8.	8.	21.	19.	106.	142.
	100	8.	7.	9.	3.	13.	19.	108.	123.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2-Aminobiphenyl (NC-2)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	2.	4.	10.	10.	7.	7.	0.	0.
	1	2.	2.	2.	2.	12.	13.	0.	1.
	10	5.	6.	5.	5.	11.	7.	1.	1.
	100	4.	3.	3.	1.	7.	0.	0.	0.
LIVER									
	0	10.	6.	9.	11.	16.	21.	0.	1.
	1	14.	5.	9.	8.	18.	19.	0.	0.
	10	10.	9.	7.	8.	23.	22.	3.	1.
	100	7.	8.	9.	7.	29.	20.	1.	0.
KIDNEY									
	0	9.	7.	16.	10.	16.	14.	1.	0.
	1	4.	10.	7.	7.	10.	12.	0.	0.
	10	16.	16.	10.	17.	20.	20.	0.	0.
	100	18.	14.	19.	18.	23.	24.	2.	0.
BRAIN									
	0	11.	9.	5.	6.	13.	14.	0.	0.
	1	14.	7.	11.	11.	14.	24.	1.	3.
	10	4.	8.	4.	7.	10.	19.	0.	1.
	100	3.	7.	2.	4.	9.	12.	1.	1.
SPLEEN									
	0	6.	13.	11.	10.	12.	18.	0.	1.
	1	8.	5.	11.	10.	22.	12.	0.	0.
	10	4.	10.	6.	8.	13.	22.	2.	1.
	100	10.	12.	11.	12.	20.	24.	2.	0.
LUNG									
	0	3.	1.	6.	7.	11.	19.	0.	1.
	1	5.	8.	12.	7.	14.	18.	1.	1.
	10	15.	9.	10.	7.	20.	22.	0.	4.
	100	18.	13.	8.	4.	11.	14.	0.	0.
STOMACH									
	0	5.	3.	3.	3.	18.	15.	0.	0.
	1	5.	5.	1.	1.	6.	11.	0.	0.
	10	4.	3.	3.	4.	9.	18.	0.	0.
	100	7.	4.	10.	4.	10.	18.	0.	0.
BLOOD									
	0	1.	3.	7.	9.	8.	6.	0.	0.
	1	6.	10.	15.	10.	15.	13.	1.	0.
	10	5.	7.	5.	13.	23.	9.	0.	0.
	100	1.	3.	4.	3.	8.	9.	0.	0.

4-Aminosalicylic Acid (NC-47)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	3.	3.	5.	9.	20.	14.	191.	146.
	1	2.	7.	3.	5.	17.	25.	193.	184.
	10	4.	3.	6.	6.	13.	16.	189.	167.
	100	3.	3.	6.	3.	18.	20.	174.	188.
LIVER									
	0	11.	10.	6.	7.	27.	20.	190.	139.
	1	8.	5.	4.	6.	23.	23.	132.	155.
	10	8.	8.	7.	6.	23.	26.	154.	168.
	100	4.	11.	4.	6.	25.	28.	164.	171.
KIDNEY									
	0	3.	4.	11.	12.	14.	20.	202.	189.
	1	7.	17.	11.	12.	8.	20.	150.	174.
	10	9.	4.	13.	11.	25.	18.	170.	194.
	100	4.	7.	10.	8.	20.	22.	184.	223.
BRAIN									
	0	7.	8.	9.	6.	25.	19.	187.	191.
	1	4.	7.	6.	6.	14.	14.	161.	165.
	10	12.	4.	6.	9.	19.	17.	199.	168.
	100	9.	5.	2.	6.	13.	16.	144.	167.
SPLEEN									
	0	6.	7.	8.	12.	19.	17.	117.	105.
	1	2.	4.	6.	5.	21.	18.	95.	128.
	10	6.	4.	7.	9.	21.	27.	118.	94.
	100	6.	4.	6.	5.	16.	16.	81.	90.
LUNG									
	0	7.	8.	11.	10.	19.	22.	101.	110.
	1	2.	2.	10.	9.	19.	22.	82.	122.
	10	6.	5.	8.	1.	17.	19.	91.	117.
	100	7.	6.	2.	6.	15.	20.	84.	85.
STOMACH									
	0	6.	12.	3.	4.	21.	23.	159.	141.
	1	3.	8.	6.	5.	16.	43.	146.	148.
	10	8.	4.	4.	3.	19.	21.	179.	132.
	100	8.	6.	4.	3.	25.	28.	211.	150.
BLOOD									
	0	5.	4.	7.	5.	16.	15.	194.	208.
	1	3.	4.	12.	9.	21.	15.	177.	118.
	10	1.	3.	6.	0.	17.	24.	140.	135.
	100	6.	3.	9.	2.	27.	10.	173.	116.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Aniline (NC-33)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	7.	9.	4.	4.	18.	23.	222.	199.
	1	9.	3.	6.	7.	5.	10.	244.	171.
	10	6.	7.	4.	5.	10.	11.	193.	225.
	100	1.	8.	8.	4.	7.	13.	180.	234.
LIVER	0	8.	4.	8.	9.	21.	22.	202.	239.
	1	12.	11.	3.	9.	21.	22.	348.	269.
	10	6.	7.	5.	8.	19.	33.	226.	314.
	100	5.	9.	9.	12.	22.	21.	438.	305.
KIDNEY	0	4.	11.	9.	8.	30.	26.	316.	248.
	1	11.	5.	10.	15.	34.	32.	302.	290.
	10	10.	16.	5.	11.	19.	18.	302.	269.
	100	10.	9.	1.	4.	15.	24.	256.	296.
BRAIN	0	10.	9.	8.	4.	19.	28.	264.	198.
	1	8.	5.	8.	8.	23.	17.	290.	300.
	10	4.	8.	1.	12.	13.	22.	205.	232.
	100	11.	6.	7.	1.	21.	23.	286.	253.
SPLEEN	0	9.	12.	5.	8.	26.	33.	286.	348.
	1	11.	9.	7.	5.	32.	32.	316.	257.
	10	21.	15.	7.	9.	22.	31.	385.	267.
	100	7.	19.	9.	12.	15.	29.	317.	362.
LUNG	0	3.	8.	4.	10.	23.	18.	235.	232.
	1	12.	7.	9.	5.	22.	11.	224.	248.
	10	10.	6.	5.	6.	22.	16.	265.	268.
	100	12.	23.	7.	4.	15.	22.	250.	234.
STOMACH	0	7.	13.	3.	7.	21.	23.	245.	219.
	1	17.	13.	9.	3.	26.	35.	223.	288.
	10	14.	12.	8.	5.	17.	24.	216.	331.
	100	22.	14.	3.	8.	30.	21.	295.	270.
BLOOD	0	4.	10.	4.	8.	12.	20.	302.	318.
	1	15.	10.	5.	9.	17.	15.	306.	285.
	10	10.	9.	11.	11.	19.	19.	362.	249.
	100	6.	8.	8.	1.	11.	17.	248.	262.

Anthracene (NC-3)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	9.	10.	7.	8.	17.	9.	1.	0.
	1	18.	12.	1.	4.	11.	14.	0.	0.
	10	15.	14.	2.	8.	18.	23.	0.	0.
	100	19.	19.	10.	4.	13.	8.	0.	1.
LIVER	0	4.	13.	9.	5.	46.	68.	0.	0.
	1	12.	15.	17.	9.	78.	64.	0.	2.
	10	6.	10.	12.	13.	53.	45.	0.	3.
	100	12.	10.	13.	15.	36.	62.	3.	1.
KIDNEY	0	15.	20.	20.	20.	32.	42.	0.	0.
	1	16.	18.	16.	20.	36.	47.	2.	2.
	10	18.	11.	9.	23.	33.	37.	1.	0.
	100	13.	16.	20.	16.	34.	30.	3.	2.
BRAIN	0	21.	17.	10.	3.	36.	25.	2.	0.
	1	10.	20.	13.	7.	33.	36.	1.	1.
	10	21.	17.	7.	9.	21.	48.	0.	0.
	100	22.	17.	11.	10.	17.	24.	2.	0.
SPLEEN	0	14.	12.	14.	13.	40.	25.	2.	2.
	1	9.	16.	14.	13.	31.	42.	1.	1.
	10	20.	16.	13.	23.	32.	33.	5.	1.
	100	17.	18.	16.	11.	30.	37.	1.	3.
LUNG	0	29.	24.	24.	37.	14.	9.	0.	1.
	1	7.	14.	39.	25.	20.	18.	0.	1.
	10	3.	1.	41.	26.	4.	2.	4.	3.
	100	19.	17.	36.	47.	17.	14.	4.	6.
STOMACH	0	13.	18.	7.	11.	28.	17.	1.	1.
	1	16.	9.	10.	10.	27.	27.	0.	1.
	10	14.	19.	15.	10.	21.	15.	1.	0.
	100	7.	13.	9.	14.	20.	14.	1.	1.
BLOOD	0	12.	9.	8.	9.	17.	20.	2.	1.
	1	14.	12.	11.	4.	29.	18.	2.	1.
	10	14.	11.	9.	4.	19.	20.	2.	1.
	100	9.	13.	9.	4.	31.	30.	1.	1.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens (Revertant Colonies per Plate; Duplicate Plates)

Atrazine (NC-59)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	3.	1.	3.	2.	16.	14.	69.	67.
	1	1.	7.	4.	0.	13.	8.	116.	118.
	10	2.	1.	5.	4.	17.	9.	104.	120.
	100	4.	8.	3.	4.	16.	17.	80.	123.
LIVER	0	4.	7.	6.	7.	14.	10.	148.	138.
	1	7.	6.	5.	4.	10.	12.	116.	124.
	10	6.	6.	1.	8.	17.	20.	128.	133.
	100	8.	3.	5.	8.	8.	17.	80.	92.
KIDNEY	0	7.	10.	8.	6.	20.	18.	88.	108.
	1	7.	8.	4.	4.	12.	18.	124.	144.
	10	3.	2.	6.	4.	20.	17.	116.	104.
	100	6.	6.	6.	6.	17.	15.	160.	118.
BRAIN	0	8.	7.	2.	3.	17.	17.	118.	148.
	1	5.	6.	1.	2.	12.	24.	102.	114.
	10	9.	9.	4.	8.	16.	18.	94.	122.
	100	8.	8.	3.	4.	16.	20.	96.	88.
SPLEEN	0	4.	7.	3.	3.	18.	18.	176.	138.
	1	4.	6.	2.	2.	10.	20.	114.	120.
	10	7.	2.	3.	2.	11.	19.	132.	92.
	100	6.	7.	4.	3.	11.	16.	112.	120.
LUNG	0	7.	6.	8.	8.	14.	10.	116.	110.
	1	7.	6.	6.	6.	13.	9.	88.	98.
	10	2.	8.	7.	2.	11.	19.	88.	103.
	100	3.	3.	2.	3.	14.	18.	116.	74.
STOMACH	0	6.	6.	8.	6.	10.	14.	102.	98.
	1	6.	7.	2.	8.	16.	13.	116.	132.
	10	3.	6.	3.	7.	18.	11.	128.	108.
	100	6.	6.	6.	2.	19.	18.	104.	128.
BLOOD	0	3.	3.	4.	3.	13.	17.	98.	88.
	1	3.	5.	4.	1.	14.	12.	92.	118.
	10	3.	2.	4.	1.	12.	16.	128.	112.
	100	3.	5.	4.	3.	18.	14.	128.	68.

Atropine Sulfate (NC-23)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	10.	11.	7.	3.	12.	6.	0.	0.
	1	3.	12.	6.	5.	10.	9.	0.	0.
	10	2.	6.	3.	6.	5.	6.	0.	0.
	100	8.	5.	7.	8.	10.	7.	0.	0.
LIVER	0	8.	12.	13.	14.	17.	14.	0.	0.
	1	12.	7.	15.	11.	24.	17.	0.	0.
	10	8.	7.	7.	19.	22.	22.	0.	0.
	100	15.	7.	24.	12.	21.	18.	1.	0.
KIDNEY	0	12.	11.	14.	28.	19.	25.	0.	0.
	1	12.	9.	18.	22.	24.	27.	0.	0.
	10	14.	8.	22.	26.	4.	0.	0.	1.
	100	9.	10.	22.	13.	24.	30.	0.	1.
BRAIN	0	12.	8.	20.	20.	13.	10.	0.	0.
	1	9.	0.	9.	4.	14.	16.	0.	0.
	10	11.	8.	10.	8.	12.	14.	0.	0.
	100	8.	7.	12.	13.	14.	15.	1.	0.
SPLEEN	0	13.	10.	22.	14.	22.	19.	2.	1.
	1	5.	3.	17.	17.	17.	15.	0.	0.
	10	6.	7.	8.	10.	20.	26.	0.	0.
	100	12.	8.	10.	11.	24.	21.	2.	0.
LUNG	0	29.	24.	24.	37.	14.	9.	0.	1.
	1	31.	9.	41.	45.	23.	22.	2.	4.
	10	22.	20.	42.	26.	16.	25.	6.	2.
	100	13.	20.	43.	25.	15.	25.	5.	2.
STOMACH	0	9.	10.	14.	12.	23.	16.	0.	0.
	1	14.	12.	19.	13.	21.	23.	0.	3.
	10	7.	6.	11.	10.	10.	15.	0.	0.
	100	11.	9.	13.	13.	17.	13.	0.	0.
BLOOD	0	8.	6.	14.	12.	21.	24.	0.	0.
	1	10.	8.	19.	7.	12.	14.	1.	0.
	10	7.	9.	14.	0.	22.	29.	2.	2.
	100	6.	11.	17.	15.	23.	14.	1.	1.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

p-Amino-azo-toluene (NC-54)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	11.	15.	8.	11.	24.	30.	132.	149.
	1	22.	18.	2.	8.	18.	23.	199.	198.
	10	24.	14.	4.	8.	22.	24.	145.	194.
	100	17.	17.	2.	5.	19.	20.	155.	131.
LIVER									
	0	13.	12.	8.	12.	24.	30.	192.	212.
	1	8.	13.	6.	4.	32.	43.	173.	244.
	10	6.	9.	12.	16.	93.	108.	280.	327.
	100	12.	9.	11.	15.	205.	286.	497.	700.
KIDNEY									
	0	12.	3.	16.	22.	47.	48.	149.	113.
	1	7.	6.	14.	24.	50.	30.	122.	222.
	10	11.	11.	8.	18.	44.	46.	219.	120.
	100	12.	5.	22.	23.	34.	42.	162.	124.
BRAIN									
	0	27.	19.	14.	3.	20.	27.	140.	160.
	1	10.	19.	9.	13.	32.	23.	172.	108.
	10	10.	14.	7.	6.	27.	26.	197.	103.
	100	14.	10.	14.	9.	27.	22.	150.	107.
SPLEEN									
	0	18.	14.	11.	17.	24.	41.	231.	230.
	1	9.	19.	12.	12.	30.	40.	194.	126.
	10	10.	15.	10.	17.	40.	42.	191.	98.
	100	6.	11.	15.	13.	44.	27.	160.	98.
LUNG									
	0	13.	11.	8.	10.	22.	20.	179.	137.
	1	21.	10.	12.	14.	37.	33.	162.	207.
	10	14.	13.	13.	12.	27.	23.	148.	226.
	100	17.	16.	13.	13.	31.	29.	129.	101.
STOMACH									
	0	17.	11.	11.	9.	20.	30.	200.	200.
	1	19.	20.	3.	9.	31.	27.	210.	190.
	10	16.	11.	4.	9.	20.	33.	169.	215.
	100	12.	19.	10.	6.	24.	25.	227.	94.
BLOOD									
	0	7.	12.	7.	9.	20.	16.	190.	218.
	1	12.	6.	6.	6.	20.	24.	217.	110.
	10	7.	8.	9.	6.	24.	20.	228.	209.
	100	6.	10.	9.	3.	14.	17.	173.	196.

p-Aminobenzoic Acid (NC-64)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	2.	5.	4.	2.	11.	12.	62.	124.
	1	3.	4.	4.	4.	13.	8.	114.	68.
	10	3.	2.	5.	2.	13.	16.	122.	162.
	100	4.	7.	3.	6.	8.	26.	116.	132.
LIVER									
	0	8.	8.	4.	4.	17.	12.	164.	118.
	1	7.	9.	6.	4.	12.	19.	120.	116.
	10	9.	5.	5.	7.	19.	13.	164.	132.
	100	3.	7.	4.	7.	17.	18.	126.	136.
KIDNEY									
	0	4.	6.	5.	8.	21.	21.	120.	113.
	1	6.	5.	3.	5.	17.	17.	137.	133.
	10	5.	6.	5.	6.	18.	17.	176.	130.
	100	5.	7.	7.	7.	20.	22.	90.	114.
BRAIN									
	0	7.	6.	4.	5.	20.	18.	114.	54.
	1	6.	5.	5.	7.	12.	17.	89.	77.
	10	5.	6.	6.	5.	18.	20.	74.	81.
	100	5.	2.	3.	4.	17.	12.	129.	131.
SPLEEN									
	0	5.	4.	6.	3.	20.	14.	122.	128.
	1	8.	9.	5.	3.	17.	19.	104.	124.
	10	7.	8.	4.	4.	15.	21.	174.	148.
	100	6.	7.	3.	8.	17.	26.	114.	114.
LUNG									
	0	5.	5.	5.	6.	18.	19.	104.	118.
	1	5.	5.	3.	4.	16.	12.	116.	146.
	10	6.	5.	5.	5.	20.	12.	82.	112.
	100	10.	5.	3.	2.	11.	17.	72.	88.
STOMACH									
	0	2.	6.	4.	3.	25.	9.	136.	136.
	1	5.	6.	5.	2.	12.	15.	142.	118.
	10	7.	4.	4.	7.	19.	28.	136.	124.
	100	6.	3.	2.	5.	15.	13.	164.	96.
BLOOD									
	0	6.	8.	3.	4.	11.	17.	188.	164.
	1	3.	5.	1.	6.	12.	14.	172.	148.
	10	7.	7.	3.	3.	11.	12.	122.	166.
	100	6.	5.	5.	8.	17.	15.	144.	154.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Antipyrene (NC-40)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	12.	11.	8.	9.	18.	210.	219.
	1	8.	6.	6.	4.	16.	16.	114.	190.
	10	14.	11.	7.	4.	10.	15.	110.	110.
	100	3.	4.	4.	6.	10.	17.	110.	170.
LIVER	0	8.	6.	7.	6.	12.	9.	220.	219.
	1	3.	6.	4.	9.	14.	10.	170.	211.
	10	8.	8.	4.	2.	10.	16.	213.	116.
	100	10.	4.	8.	2.	10.	12.	119.	111.
KIDNEY	0	7.	17.	7.	7.	10.	20.	216.	209.
	1	14.	17.	8.	19.	32.	21.	114.	110.
	10	13.	10.	9.	6.	17.	9.	225.	114.
	100	6.	12.	9.	8.	26.	17.	212.	217.
BRAIN	0	7.	22.	4.	7.	8.	10.	110.	311.
	1	15.	21.	13.	20.	10.	21.	191.	311.
	10	23.	11.	8.	2.	14.	13.	191.	172.
	100	17.	15.	6.	6.	9.	10.	100.	163.
SPLEEN	0	14.	16.	6.	6.	13.	10.	212.	112.
	1	10.	12.	3.	7.	8.	11.	171.	102.
	10	17.	20.	7.	6.	15.	14.	111.	171.
	100	4.	2.	2.	1.	9.	9.	171.	167.
LUNG	0	4.	8.	7.	11.	19.	13.	213.	119.
	1	10.	10.	6.	8.	6.	7.	121.	141.
	10	15.	14.	9.	7.	10.	14.	192.	147.
	100	19.	7.	6.	6.	7.	19.	119.	210.
STOMACH	0	8.	8.	6.	8.	19.	19.	117.	217.
	1	9.	7.	3.	8.	10.	23.	141.	211.
	10	9.	11.	4.	9.	14.	19.	204.	271.
	100	4.	7.	3.	8.	15.	11.	101.	149.
BLOOD	0	19.	12.	9.	8.	10.	11.	210.	213.
	1	9.	17.	6.	7.	11.	14.	117.	241.
	10	9.	7.	9.	7.	8.	13.	120.	194.
	100	10.	4.	7.	6.	19.	10.	121.	182.

L-Ascorbic Acid (NC-4)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	9.	11.	19.	10.	6.	14.	0.	0.
	1	9.	13.	17.	14.	9.	9.	0.	1.
	10	11.	13.	8.	21.	11.	7.	1.	1.
	100	2.	9.	19.	9.	10.	10.	0.	0.
LIVER	0	6.	6.	9.	18.	16.	20.	1.	1.
	1	10.	15.	23.	20.	30.	30.	2.	0.
	10	8.	9.	8.	14.	12.	23.	2.	1.
	100	7.	6.	15.	15.	17.	19.	1.	0.
KIDNEY	0	25.	23.	25.	30.	20.	28.	0.	2.
	1	15.	16.	28.	15.	24.	30.	0.	1.
	10	14.	19.	16.	32.	30.	30.	1.	0.
	100	10.	32.	30.	16.	33.	33.	3.	0.
BRAIN	0	3.	6.	14.	12.	13.	20.	0.	0.
	1	3.	8.	15.	11.	9.	7.	0.	0.
	10	7.	7.	14.	22.	16.	24.	0.	0.
	100	12.	6.	14.	10.	15.	29.	0.	0.
SPLEEN	0	11.	10.	8.	9.	10.	9.	1.	0.
	1	7.	6.	19.	19.	12.	10.	2.	0.
	10	10.	9.	10.	19.	13.	16.	0.	0.
	100	7.	8.	15.	10.	24.	10.	0.	1.
LUNG	0	11.	10.	8.	12.	13.	10.	0.	0.
	1	9.	10.	12.	8.	8.	8.	0.	0.
	10	11.	9.	10.	10.	14.	12.	1.	2.
	100	7.	9.	12.	14.	6.	12.	0.	0.
STOMACH	0	11.	10.	9.	10.	22.	10.	0.	0.
	1	10.	12.	9.	11.	19.	16.	1.	0.
	10	9.	10.	10.	8.	11.	20.	1.	0.
	100	10.	14.	8.	11.	12.	17.	0.	0.
BLOOD	0	9.	8.	8.	7.	10.	10.	0.	0.
	1	7.	6.	6.	10.	13.	20.	0.	0.
	10	3.	5.	8.	8.	10.	15.	0.	0.
	100	6.	3.	5.	11.	13.	19.	0.	1.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens (Revertant Colonies per Plate; Duplicate Plates)

Benzo-p-dioxin (NC-39)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LIVER	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
KIDNEY	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BRAIN	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SPLEEN	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LUNG	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
STOMACH	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BLOOD	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Benzoic Acid (NC-6)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LIVER	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
KIDNEY	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BRAIN	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SPLEEN	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LUNG	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
STOMACH	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BLOOD	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Benzo(e)pyrene (NC-51)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	7.	12.	9.	9.	19.	18.	120.	149.
	1	6.	7.	3.	9.	15.	22.	109.	130.
	10	6.	8.	6.	6.	12.	26.	114.	137.
	100	8.	9.	6.	1.	15.	12.	171.	140.
LIVER	0	11.	17.	4.	4.	23.	24.	102.	234.
	1	8.	4.	6.	8.	23.	46.	232.	210.
	10	13.	6.	11.	9.	15.	30.	198.	209.
	100	4.	11.	13.	13.	33.	26.	192.	201.
KIDNEY	0	8.	9.	8.	7.	27.	33.	304.	314.
	1	13.	6.	12.	12.	46.	46.	326.	294.
	10	11.	8.	19.	14.	25.	67.	337.	310.
	100	25.	15.	7.	11.	27.	22.	268.	221.
BRAIN	0	9.	12.	6.	5.	29.	19.	215.	189.
	1	14.	10.	5.	6.	20.	18.	207.	266.
	10	11.	3.	6.	10.	19.	18.	237.	192.
	100	11.	5.	5.	9.	23.	24.	240.	230.
SPLEEN	0	5.	10.	3.	3.	18.	21.	234.	225.
	1	11.	9.	8.	7.	33.	31.	247.	299.
	10	9.	7.	11.	11.	26.	30.	201.	273.
	100	5.	7.	6.	6.	30.	23.	261.	275.
LUNG	0	22.	8.	5.	3.	29.	23.	231.	222.
	1	15.	8.	1.	0.	13.	19.	240.	209.
	10	9.	6.	2.	1.	19.	28.	203.	192.
	100	7.	7.	2.	2.	16.	50.	179.	223.
STOMACH	0	8.	6.	15.	2.	36.	27.	188.	233.
	1	4.	10.	6.	4.	36.	17.	249.	250.
	10	4.	10.	5.	3.	30.	23.	235.	193.
	100	6.	6.	9.	6.	30.	34.	291.	191.
BLOOD	0	6.	4.	5.	7.	19.	29.	164.	215.
	1	6.	7.	9.	11.	18.	10.	237.	217.
	10	4.	3.	8.	10.	18.	19.	212.	193.
	100	6.	6.	9.	6.	12.	0.	172.	191.

Benzylmercaptan (NC-52)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	13.	10.	6.	4.	9.	20.	92.	129.
	1	1.	7.	7.	10.	9.	12.	172.	113.
	10	10.	15.	14.	6.	2.	14.	140.	143.
	100	2.	8.	9.	4.	10.	8.	211.	67.
LIVER	0	13.	12.	8.	19.	32.	30.	170.	220.
	1	11.	11.	7.	9.	64.	26.	229.	192.
	10	8.	9.	12.	7.	32.	36.	159.	181.
	100	8.	10.	7.	14.	32.	15.	193.	159.
KIDNEY	0	18.	11.	17.	17.	18.	63.	200.	209.
	1	6.	10.	19.	10.	8.	21.	140.	194.
	10	14.	10.	10.	6.	28.	26.	144.	127.
	100	7.	10.	7.	21.	23.	37.	172.	109.
BRAIN	0	10.	7.	9.	8.	11.	19.	173.	221.
	1	10.	2.	10.	7.	21.	27.	103.	171.
	10	13.	7.	13.	8.	19.	14.	193.	180.
	100	22.	17.	3.	7.	14.	13.	152.	190.
SPLEEN	0	17.	9.	11.	5.	26.	30.	130.	192.
	1	11.	9.	5.	14.	23.	21.	190.	167.
	10	7.	13.	9.	12.	19.	27.	143.	110.
	100	5.	12.	6.	7.	22.	27.	168.	172.
LUNG	0	11.	17.	7.	6.	10.	23.	204.	201.
	1	7.	13.	10.	11.	12.	13.	167.	197.
	10	4.	9.	8.	15.	19.	20.	208.	194.
	100	7.	8.	5.	4.	19.	20.	117.	204.
STOMACH	0	8.	15.	6.	6.	22.	10.	227.	190.
	1	11.	13.	7.	5.	24.	23.	180.	199.
	10	6.	9.	5.	6.	12.	33.	195.	140.
	100	6.	11.	8.	9.	30.	20.	134.	165.
BLOOD	0	5.	13.	7.	10.	21.	20.	195.	184.
	1	3.	11.	41.	14.	31.	14.	211.	156.
	10	5.	8.	14.	15.	32.	21.	231.	156.
	100	13.	6.	16.	8.	26.	23.	100.	101.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Bromobenzene (NC-7)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	29.	22.	4.	3.	20.	13.	1.	0.
	1	21.	27.	15.	18.	17.	14.	0.	2.
	10	27.	14.	16.	12.	11.	12.	1.	0.
	100	24.	21.	10.	12.	7.	14.	0.	1.
LIVER	0	14.	14.	11.	10.	41.	32.	1.	0.
	1	9.	20.	19.	17.	41.	39.	1.	3.
	10	23.	18.	32.	21.	40.	48.	0.	0.
	100	13.	17.	12.	22.	52.	39.	2.	1.
KIDNEY	0	10.	20.	12.	13.	27.	30.	0.	0.
	1	16.	19.	22.	21.	25.	26.	1.	0.
	10	13.	18.	17.	11.	22.	26.	0.	2.
	100	16.	17.	28.	12.	24.	31.	1.	0.
BRAIN	0	20.	20.	20.	9.	20.	22.	0.	2.
	1	17.	23.	14.	19.	20.	20.	0.	1.
	10	18.	23.	25.	7.	18.	19.	1.	0.
	100	16.	29.	17.	32.	22.	21.	1.	0.
SPLEEN	0	17.	11.	10.	9.	20.	13.	0.	0.
	1	15.	8.	30.	12.	19.	20.	1.	1.
	10	12.	17.	8.	8.	21.	20.	0.	0.
	100	8.	10.	10.	11.	21.	29.	1.	1.
LUNG	0	7.	15.	10.	10.	13.	21.	0.	2.
	1	6.	19.	11.	16.	30.	12.	1.	2.
	10	12.	17.	19.	8.	20.	21.	1.	1.
	100	13.	10.	10.	7.	21.	30.	0.	1.
STOMACH	0	13.	21.	9.	8.	9.	20.	0.	0.
	1	10.	6.	11.	11.	21.	17.	0.	0.
	10	13.	9.	7.	8.	17.	16.	0.	0.
	100	14.	11.	11.	12.	12.	10.	0.	0.
BLOOD	0	10.	9.	4.	11.	17.	29.	2.	0.
	1	3.	7.	11.	7.	17.	25.	0.	0.
	10	15.	6.	22.	10.	27.	15.	0.	1.
	100	9.	8.	13.	14.	20.	19.	1.	1.

Caffeine (NC-8)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	9.	12.	8.	8.	12.	13.	1.	0.
	1	9.	13.	6.	6.	8.	13.	0.	0.
	10	13.	2.	8.	8.	7.	5.	0.	0.
	100	7.	13.	4.	4.	10.	7.	0.	0.
LIVER	0	8.	14.	6.	7.	12.	8.	0.	2.
	1	16.	23.	6.	9.	8.	19.	1.	0.
	10	14.	11.	3.	10.	16.	10.	1.	0.
	100	14.	21.	6.	4.	15.	15.	0.	0.
KIDNEY	0	20.	20.	10.	15.	19.	17.	3.	3.
	1	21.	19.	6.	10.	20.	9.	0.	0.
	10	30.	30.	11.	8.	15.	10.	2.	2.
	100	21.	20.	12.	16.	12.	18.	0.	0.
BRAIN	0	32.	17.	4.	7.	8.	13.	0.	1.
	1	18.	17.	5.	8.	21.	21.	0.	0.
	10	20.	22.	9.	2.	17.	18.	1.	0.
	100	16.	20.	0.	0.	8.	8.	0.	0.
SPLEEN	0	21.	30.	2.	1.	20.	9.	2.	0.
	1	19.	23.	10.	8.	9.	7.	1.	0.
	10	20.	23.	15.	10.	14.	13.	0.	1.
	100	20.	33.	7.	12.	16.	13.	0.	1.
LUNG	0	11.	13.	8.	4.	12.	16.	0.	0.
	1	17.	14.	4.	9.	13.	8.	0.	0.
	10	9.	13.	3.	0.	11.	7.	0.	2.
	100	15.	23.	3.	6.	6.	20.	0.	1.
STOMACH	0	27.	12.	5.	6.	15.	11.	0.	0.
	1	17.	23.	10.	11.	17.	10.	4.	3.
	10	16.	14.	8.	11.	9.	17.	3.	0.
	100	18.	21.	6.	9.	11.	18.	1.	0.
BLOOD	0	7.	18.	6.	14.	10.	8.	0.	0.
	1	13.	16.	11.	2.	9.	6.	0.	0.
	10	14.	9.	6.	8.	1.	3.	0.	0.
	100	12.	15.	3.	7.	8.	9.	0.	0.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

e-Caprolactone (NC-55)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	6.	3.	5.	4.	6.	23.	182.	200.
	1	6.	9.	6.	7.	12.	15.	223.	221.
	10	10.	8.	6.	10.	29.	17.	232.	213.
	100	4.	9.	8.	7.	13.	3.	225.	195.
LIVER	0	8.	8.	2.	5.	10.	13.	231.	280.
	1	10.	15.	4.	10.	29.	34.	293.	294.
	10	6.	13.	3.	2.	19.	18.	288.	260.
	100	4.	6.	7.	11.	22.	18.	269.	292.
KIDNEY	0	7.	14.	9.	7.	62.	33.	293.	279.
	1	11.	9.	14.	13.	23.	26.	281.	313.
	10	12.	12.	7.	9.	19.	40.	246.	334.
	100	7.	6.	9.	21.	26.	20.	254.	270.
BRAIN	0	11.	13.	1.	6.	11.	23.	187.	239.
	1	9.	9.	9.	4.	15.	15.	271.	306.
	10	11.	9.	9.	9.	22.	29.	325.	203.
	100	14.	17.	6.	11.	21.	17.	262.	248.
SPLEEN	0	5.	3.	13.	9.	22.	30.	201.	233.
	1	11.	10.	14.	8.	1.	12.	303.	276.
	10	9.	6.	9.	2.	27.	15.	370.	319.
	100	10.	16.	6.	3.	15.	23.	260.	265.
LUNG	0	8.	5.	6.	9.	15.	30.	294.	320.
	1	6.	7.	2.	3.	6.	36.	172.	236.
	10	10.	13.	6.	5.	23.	17.	217.	243.
	100	4.	5.	3.	9.	18.	23.	253.	234.
STOMACH	0	9.	6.	6.	10.	23.	23.	251.	219.
	1	8.	9.	8.	8.	16.	20.	282.	221.
	10	6.	6.	5.	6.	24.	21.	201.	253.
	100	6.	6.	6.	3.	13.	20.	245.	219.
BLOOD	0	10.	9.	5.	9.	14.	14.	390.	323.
	1	7.	7.	13.	14.	10.	21.	244.	[illegible]
	10	9.	4.	7.	14.	30.	16.	200.	190.
	100	8.	4.	7.	6.	16.	9.	249.	240.

Coumarin (NC-42)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	2.	3.	7.	7.	12.	9.	109.	107.
	1	1.	3.	6.	9.	10.	13.	90.	130.
	10	2.	1.	1.	9.	15.	9.	89.	94.
	100	1.	2.	7.	5.	11.	19.	106.	132.
LIVER	0	2.	8.	7.	6.	25.	23.	60.	72.
	1	2.	6.	10.	7.	22.	19.	82.	82.
	10	3.	3.	2.	4.	28.	28.	56.	68.
	100	5.	4.	3.	10.	14.	22.	56.	69.
KIDNEY	0	1.	1.	2.	1.	2.	2.	51.	46.
	1	1.	2.	2.	1.	2.	3.	49.	53.
	10	12.	10.	5.	9.	27.	29.	149.	135.
	100	13.	9.	9.	5.	25.	22.	170.	215.
BRAIN	0	4.	5.	2.	7.	10.	30.	119.	117.
	1	5.	1.	4.	1.	12.	18.	88.	99.
	10	2.	2.	1.	9.	21.	3.	83.	79.
	100	7.	3.	4.	4.	30.	19.	91.	84.
SPLEEN	0	6.	4.	3.	5.	13.	24.	69.	54.
	1	3.	8.	1.	3.	21.	16.	59.	66.
	10	5.	8.	9.	8.	24.	19.	63.	69.
	100	2.	3.	3.	4.	11.	30.	58.	71.
LUNG	0	6.	2.	6.	9.	18.	31.	90.	93.
	1	3.	1.	11.	7.	25.	17.	109.	99.
	10	4.	4.	11.	9.	13.	27.	72.	58.
	100	4.	5.	6.	9.	10.	22.	107.	112.
STOMACH	0	10.	6.	7.	5.	15.	37.	88.	79.
	1	8.	1.	3.	4.	21.	17.	99.	77.
	10	1.	1.	8.	6.	27.	13.	104.	119.
	100	2.	4.	8.	8.	15.	20.	92.	157.
BLOOD	0	2.	2.	1.	2.	3.	4.	45.	42.
	1	3.	2.	0.	3.	18.	14.	90.	119.
	10	3.	1.	1.	1.	15.	14.	75.	38.
	100	1.	1.	1.	1.	1.	2.	3.	1.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2,4-Dichlorophenoxyacetic Acid (NC-10)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	19.	13.	9.	11.	20.	28.	0.	0.
	1	13.	13.	4.	7.	14.	18.	0.	0.
	10	22.	22.	7.	10.	18.	22.	0.	0.
	100	20.	19.	4.	6.	24.	8.	0.	0.
LIVER	0	19.	12.	9.	9.	22.	12.	0.	0.
	1	10.	10.	3.	6.	29.	17.	1.	0.
	10	20.	16.	4.	1.	23.	26.	2.	1.
	100	19.	14.	9.	10.	13.	29.	1.	0.
KIDNEY	0	15.	13.	12.	7.	19.	20.	0.	1.
	1	20.	44.	13.	19.	43.	20.	1.	0.
	10	26.	17.	10.	19.	31.	27.	1.	1.
	100	22.	7.	14.	13.	23.	18.	1.	0.
BRAIN	0	18.	9.	6.	7.	22.	10.	0.	1.
	1	29.	19.	4.	2.	15.	13.	1.	0.
	10	26.	30.	2.	5.	16.	18.	0.	0.
	100	10.	22.	5.	6.	10.	26.	2.	0.
SPLEEN	0	8.	10.	4.	9.	22.	24.	0.	0.
	1	4.	20.	0.	13.	12.	29.	0.	2.
	10	17.	14.	6.	9.	13.	20.	0.	0.
	100	0.	0.	6.	5.	17.	19.	0.	0.
LUNG	0	9.	12.	7.	7.	15.	19.	0.	0.
	1	14.	8.	15.	9.	26.	21.	1.	2.
	10	28.	6.	24.	17.	21.	21.	0.	1.
	100	28.	3.	17.	11.	26.	23.	0.	2.
STOMACH	0	26.	27.	10.	4.	24.	29.	0.	0.
	1	17.	32.	3.	9.	24.	24.	0.	2.
	10	24.	20.	6.	4.	18.	29.	0.	3.
	100	17.	34.	9.	6.	27.	20.	1.	0.
BLOOD	0	17.	14.	9.	7.	17.	13.	0.	0.
	1	17.	21.	6.	4.	19.	12.	1.	1.
	10	9.	10.	9.	10.	23.	11.	0.	0.
	100	17.	15.	4.	2.	14.	10.	0.	0.

p-Dimethylaminobenzaldehyde (NC-50)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	6.	6.	6.	6.	12.	13.	233.	218.
	1	11.	14.	3.	5.	35.	19.	209.	200.
	10	11.	13.	3.	2.	18.	24.	180.	223.
	100	13.	12.	4.	8.	20.	14.	180.	167.
LIVER	0	7.	9.	6.	7.	19.	18.	279.	264.
	1	8.	11.	13.	11.	26.	24.	226.	214.
	10	11.	9.	2.	9.	23.	22.	219.	292.
	100	9.	13.	11.	5.	43.	33.	231.	233.
KIDNEY	0	9.	8.	10.	5.	22.	23.	302.	249.
	1	5.	20.	12.	7.	25.	29.	206.	320.
	10	8.	15.	15.	9.	30.	30.	294.	203.
	100	4.	13.	17.	6.	30.	24.	211.	204.
BRAIN	0	10.	11.	8.	10.	73.	29.	249.	248.
	1	10.	18.	4.	7.	28.	41.	270.	260.
	10	17.	12.	9.	7.	33.	30.	276.	246.
	100	19.	19.	8.	6.	23.	21.	248.	247.
SPLEEN	0	10.	12.	5.	5.	29.	22.	279.	229.
	1	11.	10.	10.	9.	26.	30.	232.	164.
	10	9.	9.	5.	8.	25.	17.	237.	186.
	100	6.	22.	6.	5.	22.	30.	220.	200.
LUNG	0	10.	13.	6.	10.	19.	18.	290.	202.
	1	7.	7.	7.	5.	33.	21.	204.	183.
	10	11.	10.	7.	6.	20.	17.	193.	201.
	100	20.	10.	7.	5.	24.	25.	176.	135.
STOMACH	0	9.	8.	4.	3.	23.	30.	207.	262.
	1	15.	15.	5.	5.	26.	30.	253.	203.
	10	11.	10.	7.	3.	20.	25.	212.	183.
	100	11.	11.	6.	5.	37.	16.	200.	192.
BLOOD	0	9.	6.	10.	8.	22.	13.	278.	209.
	1	7.	6.	3.	3.	20.	14.	198.	312.
	10	12.	8.	5.	8.	17.	21.	292.	204.
	100	3.	3.	6.	10.	13.	13.	202.	274.

APPENDIX B-1 (Continued)
Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

N,N-Dimethylformamide (NC-60)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	6.	8.	2.	6.	9.	14.	79.	88.
	1	1.	3.	7.	2.	6.	4.	96.	124.
	10	3.	3.	1.	5.	5.	9.	102.	116.
	100	3.	1.	2.	4.	7.	8.	92.	78.
LIVER	0	8.	3.	7.	7.	11.	17.	136.	122.
	1	9.	9.	2.	12.	14.	19.	100.	113.
	10	9.	3.	4.	7.	8.	11.	134.	142.
	100	14.	11.	6.	8.	17.	19.	88.	129.
KIDNEY	0	3.	3.	3.	8.	14.	13.	130.	118.
	1	8.	1.	6.	6.	16.	16.	121.	136.
	10	4.	10.	6.	10.	18.	13.	136.	122.
	100	6.	9.	7.	7.	20.	22.	92.	116.
BRAIN	0	9.	12.	2.	8.	10.	19.	127.	121.
	1	7.	13.	3.	8.	13.	13.	82.	99.
	10	8.	14.	7.	6.	12.	21.	81.	123.
	100	10.	9.	2.	6.	14.	23.	98.	131.
SPLEEN	0	3.	6.	4.	8.	19.	17.	124.	104.
	1	5.	5.	6.	6.	21.	13.	128.	118.
	10	4.	4.	4.	8.	19.	10.	130.	124.
	100	3.	6.	4.	8.	19.	13.	101.	113.
LUNG	0	3.	3.	6.	2.	12.	10.	88.	114.
	1	1.	6.	3.	6.	13.	9.	118.	126.
	10	4.	3.	3.	8.	18.	11.	104.	117.
	100	3.	6.	2.	4.	19.	8.	124.	107.
STOMACH	0	6.	8.	6.	4.	8.	9.	124.	118.
	1	10.	12.	6.	4.	13.	19.	92.	103.
	10	6.	8.	2.	1.	21.	12.	76.	116.
	100	7.	7.	1.	2.	18.	19.	108.	133.
BLOOD	0	6.	11.	7.	3.	10.	15.	103.	94.
	1	3.	4.	3.	8.	11.	11.	92.	130.
	10	2.	6.	4.	8.	10.	12.	76.	112.
	100	3.	1.	6.	4.	11.	12.	124.	124.

Dinitrophenol (NC-43)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	16.	2.	7.	11.	11.	19.	298.	198.
	1	7.	8.	9.	6.	30.	30.	108.	132.
	10	2.	4.	10.	4.	24.	19.	131.	116.
	100	4.	3.	3.	9.	11.	13.	134.	127.
LIVER	0	13.	9.	10.	3.	29.	24.	83.	262.
	1	9.	5.	8.	11.	37.	28.	88.	140.
	10	7.	8.	1.	9.	19.	29.	156.	120.
	100	5.	10.	3.	9.	22.	38.	136.	132.
KIDNEY	0	9.	11.	10.	10.	39.	31.	180.	182.
	1	27.	26.	8.	16.	48.	38.	188.	271.
	10	12.	16.	24.	22.	40.	47.	148.	148.
	100	9.	16.	21.	15.	43.	34.	188.	161.
BRAIN	0	16.	6.	12.	8.	25.	21.	79.	177.
	1	10.	5.	7.	1.	18.	18.	104.	174.
	10	8.	5.	12.	7.	27.	30.	92.	69.
	100	12.	5.	8.	18.	29.	37.	115.	97.
SPLEEN	0	6.	10.	5.	8.	22.	16.	[illegible]	291.
	1	13.	14.	5.	5.	19.	22.	264.	63.
	10	10.	1.	9.	5.	23.	62.	94.	49.
	100	11.	13.	7.	20.	37.	30.	61.	73.
LUNG	0	17.	17.	11.	4.	35.	19.	88.	131.
	1	16.	15.	12.	14.	32.	26.	375.	88.
	10	29.	11.	16.	10.	28.	27.	326.	304.
	100	13.	7.	12.	11.	27.	19.	317.	313.
STOMACH	0	6.	6.	9.	4.	28.	27.	91.	271.
	1	8.	13.	12.	12.	35.	31.	72.	98.
	10	9.	4.	3.	6.	27.	29.	66.	117.
	100	11.	6.	6.	8.	38.	41.	109.	103.
BLOOD	0	9.	5.	6.	8.	24.	19.	309.	123.
	1	4.	8.	13.	5.	20.	25.	93.	130.
	10	10.	8.	7.	11.	27.	16.	232.	137.
	100	8.	5.	2.	10.	19.	18.	107.	103.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Disodium EDTA (NC-49)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	14.	11.	4.	4.	12.	22.	235.	240.
	1	22.	30.	7.	3.	17.	26.	226.	242.
	10	19.	21.	4.	2.	22.	15.	242.	237.
	100	19.	10.	4.	3.	23.	21.	320.	270.
LIVER	0	16.	14.	6.	10.	10.	10.	250.	283.
	1	17.	6.	14.	7.	39.	20.	146.	253.
	10	9.	17.	8.	8.	36.	37.	295.	260.
	100	11.	12.	5.	7.	23.	19.	225.	259.
KIDNEY	0	14.	35.	19.	19.	36.	34.	304.	375.
	1	30.	35.	24.	25.	77.	29.	290.	312.
	10	26.	29.	17.	15.	23.	29.	340.	306.
	100	21.	22.	9.	25.	31.	30.	300.	275.
BRAIN	0	11.	14.	8.	12.	25.	21.	250.	331.
	1	11.	19.	12.	12.	23.	30.	306.	283.
	10	17.	16.	6.	10.	27.	34.	314.	319.
	100	10.	11.	6.	1.	30.	20.	314.	395.
SPLEEN	0	14.	13.	7.	10.	22.	30.	201.	280.
	1	13.	10.	6.	6.	16.	15.	296.	205.
	10	22.	18.	9.	8.	21.	30.	251.	197.
	100	19.	16.	11.	10.	23.	20.	193.	173.
LUNG	0	22.	13.	6.	7.	24.	36.	271.	240.
	1	9.	7.	7.	9.	27.	15.	220.	199.
	10	14.	9.	15.	8.	20.	23.	269.	206.
	100	11.	11.	8.	5.	27.	25.	285.	260.
STOMACH	0	12.	13.	9.	5.	35.	23.	246.	280.
	1	15.	12.	10.	7.	31.	35.	276.	293.
	10	8.	10.	4.	6.	29.	23.	245.	249.
	100	5.	13.	4.	6.	30.	27.	218.	300.
BLOOD	0	12.	10.	3.	0.	14.	17.	334.	302.
	1	8.	15.	6.	6.	23.	22.	376.	318.
	10	6.	10.	2.	1.	26.	19.	340.	300.
	100	16.	17.	6.	2.	27.	20.	314.	325.

Endosulfan (NC-61)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	8.	4.	6.	4.	13.	9.	98.	84.
	1	1.	9.	3.	6.	12.	11.	96.	112.
	10	5.	2.	5.	9.	17.	14.	110.	116.
	100	6.	3.	4.	3.	6.	15.	112.	104.
LIVER	0	9.	4.	5.	6.	16.	14.	78.	56.
	1	4.	7.	7.	5.	22.	16.	88.	95.
	10	6.	6.	3.	5.	10.	16.	124.	92.
	100	3.	4.	8.	10.	14.	14.	124.	130.
KIDNEY	0	6.	5.	3.	4.	12.	17.	124.	124.
	1	1.	6.	4.	4.	10.	6.	72.	120.
	10	4.	4.	5.	7.	15.	13.	100.	99.
	100	3.	6.	5.	6.	12.	19.	110.	103.
BRAIN	0	5.	6.	1.	9.	7.	9.	100.	122.
	1	4.	6.	4.	4.	14.	14.	84.	75.
	10	2.	5.	3.	5.	16.	11.	104.	118.
	100	3.	3.	5.	6.	13.	14.	110.	88.
SPLEEN	0	7.	9.	4.	4.	23.	9.	79.	88.
	1	2.	5.	5.	4.	21.	11.	123.	104.
	10	4.	4.	5.	6.	15.	10.	108.	115.
	100	6.	4.	4.	2.	14.	10.	78.	112.
LUNG	0	5.	7.	2.	6.	20.	10.	104.	82.
	1	4.	3.	6.	3.	11.	12.	124.	103.
	10	2.	6.	4.	5.	8.	12.	70.	102.
	100	5.	1.	3.	2.	15.	14.	114.	133.
STOMACH	0	6.	4.	4.	2.	7.	12.	90.	73.
	1	2.	5.	1.	5.	13.	11.	84.	94.
	10	2.	3.	6.	4.	10.	13.	104.	110.
	100	3.	9.	2.	4.	9.	12.	112.	98.
BLOOD	0	3.	2.	5.	4.	12.	12.	136.	108.
	1	5.	2.	1.	1.	3.	12.	120.	103.
	10	2.	4.	4.	5.	8.	7.	94.	160.
	100	4.	5.	2.	5.	13.	12.	112.	98.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Ferbam (NC-62)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	6.	2.	4.	5.	10.	19.	86.	72.
	1	2.	4.	3.	4.	14.	10.	72.	80.
	10	5.	8.	7.	1.	8.	17.	84.	62.
	100	5.	6.	10.	9.	22.	20.	96.	76.
LIVER	0	4.	8.	3.	5.	16.	9.	122.	110.
	1	7.	8.	1.	4.	16.	16.	108.	136.
	10	9.	6.	6.	9.	17.	9.	112.	148.
	100	1.	3.	3.	2.	14.	10.	79.	88.
KIDNEY	0	8.	9.	4.	5.	12.	14.	114.	139.
	1	5.	4.	7.	7.	13.	12.	146.	123.
	10	7.	7.	4.	4.	16.	15.	162.	112.
	100	4.	6.	6.	3.	19.	10.	130.	144.
BRAIN	0	8.	3.	3.	3.	11.	12.	62.	104.
	1	7.	3.	2.	4.	15.	8.	126.	88.
	10	1.	4.	5.	6.	9.	3.	167.	104.
	100	4.	7.	8.	9.	16.	20.	193.	166.
SPLEEN	0	4.	9.	4.	6.	10.	10.	70.	118.
	1	10.	11.	7.	5.	10.	10.	116.	134.
	10	5.	5.	2.	3.	12.	11.	127.	110.
	100	4.	3.	4.	3.	9.	10.	112.	64.
LUNG	0	7.	6.	2.	4.	17.	18.	129.	124.
	1	7.	10.	5.	4.	9.	8.	120.	126.
	10	4.	7.	5.	4.	10.	12.	127.	114.
	100	6.	3.	7.	5.	6.	10.	130.	121.
STOMACH	0	4.	2.	3.	2.	7.	7.	100.	96.
	1	9.	7.	3.	4.	13.	4.	121.	117.
	10	5.	7.	3.	5.	12.	9.	110.	112.
	100	5.	6.	6.	3.	11.	10.	84.	96.
BLOOD	0	5.	2.	5.	3.	12.	7.	84.	110.
	1	2.	2.	2.	4.	6.	9.	124.	115.
	10	3.	2.	3.	5.	11.	15.	112.	109.
	100	8.	5.	6.	2.	11.	6.	127.	162.

Gibberellic Acid (NC-11)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1538	
NONE	0	10.	2.	2.	1.	18.	12.	0.	0.
	1	7.	14.	6.	5.	10.	16.	0.	0.
	10	5.	16.	5.	4.	14.	13.	0.	1.
	100	7.	16.	4.	8.	12.	9.	0.	0.
LIVER	0	11.	15.	7.	3.	25.	17.	0.	0.
	1	8.	7.	6.	10.	22.	13.	1.	1.
	10	9.	4.	5.	5.	20.	18.	1.	0.
	100	13.	6.	5.	11.	22.	17.	0.	0.
KIDNEY	0	16.	18.	21.	19.	26.	20.	1.	2.
	1	9.	13.	13.	12.	30.	27.	2.	2.
	10	8.	17.	11.	11.	23.	20.	0.	0.
	100	9.	10.	15.	11.	27.	32.	1.	1.
BRAIN	0	8.	12.	7.	9.	21.	21.	0.	2.
	1	11.	5.	4.	8.	14.	15.	1.	0.
	10	13.	4.	6.	6.	17.	23.	0.	0.
	100	11.	12.	2.	2.	17.	15.	1.	1.
SPLEEN	0	11.	10.	6.	7.	27.	24.	0.	0.
	1	10.	11.	6.	2.	18.	22.	0.	0.
	10	16.	21.	9.	7.	20.	23.	1.	3.
	100	9.	9.	11.	8.	24.	24.	0.	0.
LUNG	0	29.	24.	24.	37.	16.	9.	0.	1.
	1	9.	21.	40.	18.	22.	20.	3.	1.
	10	22.	26.	35.	26.	21.	33.	2.	3.
	100	14.	20.	33.	45.	20.	18.	2.	3.
STOMACH	0	6.	14.	9.	3.	18.	16.	0.	1.
	1	9.	10.	7.	4.	15.	15.	1.	0.
	10	11.	7.	9.	0.	12.	13.	1.	0.
	100	19.	9.	3.	10.	22.	16.	1.	0.
BLOOD	0	3.	9.	3.	11.	24.	16.	2.	0.
	1	5.	8.	6.	4.	24.	10.	0.	0.
	10	11.	15.	8.	4.	12.	9.	0.	0.
	100	4.	9.	5.	3.	8.	0.	0.	2.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Glutathione (NC-12)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	5.	2.	4.	4.	3.	0.	0.	0.
	1	1.	0.	4.	6.	6.	8.	0.	0.
	10	1.	2.	5.	2.	7.	6.	0.	1.
	100	3.	3.	4.	3.	7.	3.	0.	0.
LIVER	0	14.	10.	11.	5.	17.	10.	0.	0.
	1	5.	9.	9.	7.	15.	14.	0.	1.
	10	6.	12.	9.	6.	26.	15.	0.	1.
	100	11.	9.	6.	5.	11.	13.	0.	0.
KIDNEY	0	9.	13.	10.	15.	19.	20.	0.	0.
	1	7.	12.	8.	10.	13.	27.	0.	0.
	10	7.	2.	8.	4.	17.	27.	0.	2.
	100	15.	8.	15.	7.	20.	30.	0.	1.
BRAIN	0	6.	8.	13.	0.	9.	3.	0.	0.
	1	9.	7.	7.	8.	10.	10.	0.	0.
	10	8.	5.	6.	4.	10.	10.	0.	1.
	100	3.	7.	3.	4.	13.	6.	1.	0.
SPLEEN	0	8.	9.	5.	5.	17.	17.	0.	0.
	1	17.	9.	9.	5.	14.	9.	0.	0.
	10	6.	8.	8.	7.	16.	12.	0.	0.
	100	14.	12.	7.	9.	18.	13.	1.	0.
LUNG	0	6.	8.	4.	8.	21.	10.	11.	4.
	1	7.	11.	7.	5.	8.	15.	0.	0.
	10	7.	5.	3.	6.	18.	10.	1.	0.
	100	10.	8.	2.	7.	16.	18.	0.	0.
STOMACH	0	14.	14.	2.	9.	22.	19.	0.	2.
	1	10.	6.	7.	7.	10.	14.	1.	3.
	10	9.	11.	5.	7.	14.	19.	1.	1.
	100	9.	9.	8.	4.	10.	11.	2.	1.
BLOOD	0	1.	6.	3.	1.	7.	7.	0.	0.
	1	3.	8.	4.	1.	9.	15.	0.	0.
	10	1.	4.	7.	9.	12.	14.	0.	0.
	100	4.	8.	6.	7.	12.	10.	0.	0.

Malathion (NC-57)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	2.	1.	4.	3.	9.	10.	124.	100.
	1	3.	1.	2.	4.	9.	6.	110.	104.
	10	1.	3.	3.	3.	6.	5.	111.	92.
	100	3.	2.	3.	2.	10.	13.	98.	112.
LIVER	0	4.	3.	9.	6.	12.	14.	126.	137.
	1	7.	3.	3.	4.	12.	12.	116.	123.
	10	4.	5.	5.	6.	12.	7.	99.	124.
	100	3.	5.	1.	5.	10.	11.	94.	103.
KIDNEY	0	5.	4.	4.	6.	15.	10.	132.	104.
	1	4.	6.	7.	3.	11.	14.	96.	104.
	10	5.	7.	5.	7.	12.	10.	129.	92.
	100	8.	6.	6.	7.	13.	12.	120.	112.
BRAIN	0	3.	4.	5.	3.	12.	13.	99.	113.
	1	4.	4.	4.	6.	9.	10.	98.	102.
	10	3.	4.	8.	4.	7.	13.	106.	103.
	100	4.	4.	3.	5.	12.	14.	130.	117.
SPLEEN	0	5.	0.	3.	5.	7.	8.	129.	118.
	1	4.	2.	4.	4.	6.	13.	136.	144.
	10	5.	0.	5.	4.	12.	18.	127.	107.
	100	13.	8.	4.	5.	16.	11.	133.	120.
LUNG	0	4.	2.	4.	4.	12.	8.	113.	119.
	1	3.	4.	3.	6.	7.	8.	96.	72.
	10	5.	4.	7.	3.	10.	13.	125.	103.
	100	1.	4.	5.	5.	12.	13.	115.	123.
STOMACH	0	4.	0.	7.	3.	12.	18.	96.	103.
	1	8.	5.	5.	6.	11.	12.	134.	122.
	10	6.	3.	2.	5.	10.	8.	125.	112.
	100	1.	4.	3.	3.	13.	6.	139.	144.
BLOOD	0	6.	3.	2.	5.	7.	10.	82.	130.
	1	4.	5.	2.	2.	11.	11.	88.	134.
	10	3.	5.	5.	5.	4.	12.	102.	96.
	100	4.	6.	6.	6.	7.	12.	116.	102.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Methyl Carbamate (NC-34)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	10.	13.	2.	9.	14.	10.	192.	149.
	1	10.	6.	3.	5.	19.	7.	102.	80.
	10	11.	8.	8.	8.	3.	7.	122.	167.
	100	10.	19.	3.	1.	15.	9.	120.	154.
LIVER	0	7.	8.	2.	4.	12.	11.	212.	192.
	1	15.	6.	4.	2.	26.	24.	190.	210.
	10	5.	8.	7.	7.	45.	13.	178.	159.
	100	8.	5.	4.	3.	24.	28.	220.	163.
KIDNEY	0	12.	7.	16.	25.	54.	48.	145.	113.
	1	30.	13.	16.	16.	43.	50.	252.	201.
	10	25.	17.	25.	18.	75.	40.	242.	232.
	100	14.	18.	25.	14.	39.	45.	255.	231.
BRAIN	0	17.	21.	3.	4.	13.	17.	190.	200.
	1	14.	15.	10.	7.	24.	26.	220.	178.
	10	8.	0.	10.	3.	20.	26.	211.	161.
	100	9.	10.	5.	8.	23.	13.	178.	202.
SPLEEN	0	12.	11.	7.	10.	18.	15.	231.	236.
	1	12.	14.	6.	3.	21.	18.	200.	170.
	10	13.	20.	10.	7.	25.	26.	154.	166.
	100	14.	13.	9.	6.	20.	24.	179.	201.
LUNG	0	12.	19.	7.	3.	16.	23.	179.	197.
	1	12.	17.	8.	9.	19.	23.	197.	164.
	10	11.	15.	6.	9.	17.	14.	300.	180.
	100	18.	10.	7.	8.	22.	19.	144.	158.
STOMACH	0	12.	21.	6.	5.	21.	18.	200.	209.
	1	9.	29.	7.	6.	17.	24.	192.	148.
	10	18.	18.	4.	10.	16.	18.	182.	159.
	100	11.	20.	7.	7.	17.	16.	169.	180.
BLOOD	0	11.	11.	5.	9.	18.	26.	180.	218.
	1	9.	5.	2.	3.	18.	17.	175.	193.
	10	14.	9.	6.	11.	24.	20.	163.	218.
	100	9.	12.	4.	4.	18.	25.	223.	160.

2-Methyl-N,N-dimethylaminoazobenzene (NC-36)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	48.	25.	10.	8.	8.	12.	249.	320.
	1	8.	13.	10.	13.	33.	19.	176.	191.
	10	15.	17.	14.	10.	31.	21.	192.	203.
	100	23.	14.	10.	13.	17.	20.	180.	199.
LIVER	0	19.	13.	7.	11.	9.	26.	596.	493.
	1	12.	17.	24.	17.	34.	35.	257.	279.
	10	15.	10.	22.	26.	25.	48.	267.	310.
	100	9.	12.	16.	12.	60.	27.	302.	318.
KIDNEY	0	12.	8.	7.	9.	32.	16.	183.	243.
	1	10.	7.	40.	33.	23.	43.	230.	221.
	10	9.	16.	24.	41.	24.	38.	237.	182.
	100	12.	13.	30.	31.	38.	37.	169.	211.
BRAIN	0	7.	7.	7.	4.	12.	18.	207.	250.
	1	10.	11.	10.	10.	22.	25.	190.	186.
	10	12.	13.	5.	5.	36.	27.	181.	171.
	100	11.	8.	7.	6.	21.	27.	191.	153.
SPLEEN	0	10.	12.	23.	26.	30.	16.	229.	234.
	1	10.	18.	24.	23.	33.	29.	188.	195.
	10	14.	12.	14.	18.	27.	25.	181.	172.
	100	5.	13.	19.	16.	24.	34.	232.	210.
LUNG	0	11.	10.	9.	5.	27.	41.	215.	206.
	1	16.	22.	12.	13.	36.	46.	228.	174.
	10	11.	9.	16.	13.	50.	54.	196.	243.
	100	30.	25.	14.	4.	45.	54.	263.	230.
STOMACH	0	17.	15.	17.	18.	31.	33.	261.	235.
	1	15.	13.	14.	5.	10.	11.	209.	223.
	10	16.	10.	16.	11.	20.	20.	223.	218.
	100	11.	6.	6.	5.	26.	31.	216.	199.
BLOOD	0	9.	9.	8.	8.	19.	17.	179.	199.
	1	10.	8.	5.	5.	24.	19.	223.	225.
	10	10.	7.	1.	5.	24.	16.	196.	222.
	100	5.	13.	4.	7.	14.	15.	215.	220.

APPENDIX B-1 (Continued)

Results of *Salmonella* Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Methyl Orange (NC-13)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	20.	16.	10.	9.	19.	27.	1.	0.
	1	15.	16.	7.	3.	20.	16.	4.	3.
	10	15.	12.	7.	8.	25.	17.	3.	0.
	100	25.	13.	4.	7.	19.	21.	0.	1.
LIVER	0	18.	10.	17.	15.	25.	29.	1.	1.
	1	11.	10.	14.	15.	25.	37.	1.	2.
	10	11.	8.	20.	15.	57.	39.	4.	2.
	100	14.	7.	16.	23.	40.	37.	1.	3.
KIDNEY	0	17.	14.	26.	23.	58.	53.	1.	2.
	1	18.	26.	39.	34.	38.	25.	4.	2.
	10	13.	20.	16.	29.	41.	51.	1.	6.
	100	22.	20.	26.	23.	34.	30.	2.	6.
BRAIN	0	10.	14.	4.	9.	32.	32.	1.	1.
	1	24.	20.	8.	7.	30.	29.	1.	1.
	10	13.	19.	14.	10.	28.	30.	4.	0.
	100	8.	16.	9.	9.	32.	23.	0.	1.
SPLEEN	0	16.	16.	19.	21.	38.	33.	1.	3.
	1	9.	19.	13.	19.	42.	39.	3.	3.
	10	18.	21.	17.	18.	44.	53.	0.	1.
	100	12.	13.	20.	19.	30.	40.	1.	2.
LUNG	0	29.	24.	24.	37.	14.	9.	0.	1.
	1	17.	17.	43.	22.	33.	21.	3.	1.
	10	18.	14.	33.	46.	46.	35.	2.	2.
	100	11.	10.	40.	43.	14.	32.	2.	3.
STOMACH	0	27.	20.	7.	7.	29.	27.	0.	1.
	1	21.	19.	11.	7.	35.	37.	2.	1.
	10	12.	7.	5.	10.	24.	22.	2.	3.
	100	26.	21.	20.	6.	35.	41.	2.	0.
BLOOD	0	12.	15.	11.	11.	29.	24.	0.	1.
	1	16.	18.	16.	14.	35.	33.	0.	1.
	10	16.	17.	15.	9.	37.	33.	2.	1.
	100	16.	15.	14.	18.	32.	41.	0.	5.

Naphthalene (NC-14)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	8.	4.	3.	8.	13.	17.	0.	0.
	1	12.	12.	4.	7.	15.	8.	0.	0.
	10	13.	11.	4.	4.	11.	12.	0.	1.
	100	9.	8.	4.	2.	12.	11.	0.	0.
LIVER	0	6.	14.	2.	9.	20.	21.	0.	0.
	1	1.	1.	12.	5.	10.	19.	1.	0.
	10	19.	7.	6.	5.	13.	23.	0.	1.
	100	9.	8.	5.	6.	22.	20.	1.	0.
KIDNEY	0	15.	14.	13.	14.	22.	23.	0.	3.
	1	19.	6.	14.	12.	22.	21.	0.	0.
	10	16.	15.	8.	11.	28.	33.	0.	1.
	100	5.	9.	4.	8.	33.	27.	0.	0.
BRAIN	0	11.	19.	8.	3.	17.	13.	0.	3.
	1	26.	19.	3.	4.	12.	14.	1.	0.
	10	16.	15.	5.	4.	19.	13.	0.	0.
	100	8.	12.	2.	6.	13.	16.	1.	1.
SPLEEN	0	15.	13.	5.	6.	12.	22.	0.	0.
	1	9.	10.	5.	8.	17.	25.	1.	0.
	10	11.	14.	3.	7.	17.	22.	1.	3.
	100	5.	7.	10.	5.	16.	16.	2.	2.
LUNG	0	29.	26.	24.	37.	14.	9.	0.	1.
	1	34.	29.	45.	45.	26.	27.	1.	1.
	10	27.	24.	44.	35.	30.	27.	3.	3.
	100	22.	20.	40.	60.	22.	24.	4.	3.
STOMACH	0	20.	16.	9.	7.	14.	11.	3.	0.
	1	14.	14.	6.	6.	20.	18.	0.	0.
	10	5.	14.	1.	4.	17.	18.	0.	0.
	100	20.	18.	4.	6.	12.	17.	0.	0.
BLOOD	0	12.	9.	3.	9.	20.	14.	1.	0.
	1	3.	7.	9.	11.	10.	14.	0.	0.
	10	9.	6.	6.	4.	16.	9.	0.	3.
	100	5.	5.	3.	8.	7.	10.	0.	0.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2-Naphthol (NC-31)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	19.	11.	8.	1.	23.	25.	199.	193.
	1	19.	13.	6.	8.	27.	17.	180.	247.
	10	11.	17.	7.	5.	15.	15.	224.	202.
	100	25.	17.	9.	6.	20.	21.	206.	130.
LIVER	0	13.	1.	9.	10.	31.	21.	282.	258.
	1	14.	14.	11.	10.	42.	35.	222.	250.
	10	9.	9.	11.	10.	27.	30.	208.	204.
	100	8.	10.	9.	6.	35.	27.	270.	234.
KIDNEY	0	19.	12.	18.	10.	30.	23.	236.	230.
	1	6.	13.	14.	13.	28.	33.	262.	246.
	10	19.	10.	10.	20.	31.	34.	230.	280.
	100	15.	15.	14.	12.	19.	-1.	216.	220.
BRAIN	0	12.	6.	13.	7.	29.	26.	171.	166.
	1	17.	22.	6.	14.	21.	24.	204.	190.
	10	19.	19.	9.	5.	26.	27.	196.	175.
	100	17.	11.	14.	8.	21.	25.	164.	156.
SPLEEN	0	8.	8.	7.	6.	31.	25.	191.	210.
	1	16.	16.	7.	11.	16.	24.	182.	178.
	10	6.	15.	1.	9.	10.	29.	166.	225.
	100	9.	7.	9.	11.	27.	25.	186.	222.
LUNG	0	16.	18.	12.	16.	20.	26.	184.	199.
	1	19.	17.	15.	8.	26.	22.	220.	216.
	10	15.	19.	11.	10.	29.	31.	182.	234.
	100	25.	17.	10.	12.	33.	30.	190.	207.
STOMACH	0	18.	12.	11.	6.	23.	20.	277.	190.
	1	13.	15.	16.	9.	26.	27.	230.	176.
	10	12.	16.	7.	21.	26.	30.	216.	223.
	100	20.	11.	13.	18.	20.	30.	227.	142.
BLOOD	0	10.	7.	7.	19.	30.	47.	200.	230.
	1	10.	7.	11.	11.	31.	15.	183.	200.
	10	9.	12.	10.	5.	20.	29.	177.	182.
	100	11.	13.	6.	11.	37.	26.	181.	247.

α-Naphthylamine (NC-27)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	7.	7.	6.	9.	11.	10.	0.	0.
	1	8.	5.	6.	6.	12.	9.	0.	0.
	10	6.	8.	4.	2.	11.	4.	0.	0.
	100	10.	5.	12.	11.	12.	6.	0.	0.
LIVER	0	7.	4.	9.	8.	13.	14.	1.	2.
	1	6.	6.	6.	8.	20.	17.	1.	1.
	10	8.	5.	2.	4.	29.	27.	0.	0.
	100	10.	11.	12.	11.	17.	24.	1.	1.
KIDNEY	0	16.	14.	12.	13.	7.	10.	1.	1.
	1	8.	10.	7.	11.	26.	30.	2.	0.
	10	9.	7.	7.	11.	14.	16.	0.	1.
	100	13.	7.	14.	11.	15.	10.	1.	0.
BRAIN	0	10.	9.	0.	1.	9.	7.	0.	0.
	1	16.	13.	8.	9.	9.	9.	0.	0.
	10	11.	10.	5.	11.	10.	10.	1.	1.
	100	17.	14.	4.	3.	13.	14.	1.	0.
SPLEEN	0	14.	15.	1.	5.	20.	10.	0.	0.
	1	9.	14.	8.	8.	9.	15.	0.	0.
	10	6.	10.	4.	3.	27.	7.	0.	0.
	100	9.	7.	2.	3.	13.	19.	2.	3.
LUNG	0	8.	9.	7.	14.	10.	11.	0.	0.
	1	12.	6.	10.	8.	16.	12.	1.	0.
	10	8.	11.	7.	5.	20.	15.	0.	0.
	100	4.	7.	6.	9.	10.	10.	0.	0.
STOMACH	0	16.	20.	7.	2.	11.	7.	0.	0.
	1	5.	4.	3.	6.	10.	9.	1.	0.
	10	8.	8.	8.	8.	12.	17.	0.	1.
	100	11.	14.	9.	3.	9.	8.	0.	1.
BLOOD	0	9.	9.	7.	13.	10.	8.	0.	0.
	1	8.	1.	9.	3.	10.	12.	0.	0.
	10	5.	5.	8.	7.	8.	9.	1.	0.
	100	3.	10.	6.	6.	3.	6.	0.	0.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

p-Nitrophenol (NC-46)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 98	
NONE	0	4.	0.	4.	4.	10.	11.	191.	180.
	1	5.	3.	5.	0.	26.	21.	131.	152.
	10	4.	7.	2.	7.	17.	14.	102.	149.
	100	3.	0.	6.	7.	16.	15.	129.	192.
LIVER	0	9.	4.	6.	12.	34.	33.	99.	40.
	1	9.	6.	9.	11.	45.	51.	91.	77.
	10	3.	11.	5.	6.	24.	22.	75.	67.
	100	7.	6.	0.	6.	20.	45.	54.	48.
KIDNEY	0	10.	12.	20.	17.	37.	50.	219.	180.
	1	12.	13.	15.	16.	42.	56.	100.	170.
	10	14.	14.	22.	20.	32.	50.	106.	195.
	100	11.	16.	22.	21.	33.	44.	131.	108.
BRAIN	0	12.	0.	6.	6.	42.	39.	140.	160.
	1	13.	9.	0.	8.	27.	32.	153.	143.
	10	14.	15.	6.	12.	18.	30.	142.	200.
	100	13.	11.	4.	7.	29.	44.	169.	103.
SPLEEN	0	9.	10.	5.	5.	19.	22.	80.	99.
	1	11.	8.	2.	0.	46.	40.	100.	119.
	10	4.	4.	11.	7.	47.	44.	84.	90.
	100	11.	0.	7.	5.	31.	47.	84.	93.
LUNG	0	8.	9.	5.	11.	40.	31.	105.	103.
	1	16.	7.	14.	8.	41.	37.	107.	115.
	10	6.	11.	0.	8.	23.	24.	118.	125.
	100	7.	7.	4.	12.	32.	43.	100.	110.
STOMACH	0	10.	7.	12.	10.	24.	30.	177.	190.
	1	14.	7.	5.	6.	26.	37.	149.	184.
	10	9.	8.	5.	3.	28.	24.	173.	102.
	100	13.	13.	8.	6.	21.	27.	144.	139.
BLOOD	0	11.	16.	10.	10.	36.	35.	119.	170.
	1	7.	5.	5.	17.	36.	28.	112.	142.
	10	4.	7.	11.	11.	41.	29.	123.	126.
	100	9.	8.	10.	8.	30.	30.	123.	110.

d-Pantothenic Acid (NC-21)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	5.	5.	0.	3.	10.	10.	1.	0.
	1	2.	3.	4.	4.	5.	7.	0.	0.
	10	2.	3.	3.	3.	9.	5.	0.	0.
	100	5.	3.	5.	6.	5.	12.	0.	0.
LIVER	0	9.	14.	11.	11.	27.	27.	1.	1.
	1	5.	0.	4.	9.	15.	16.	0.	0.
	10	0.	9.	5.	8.	20.	24.	0.	0.
	100	8.	9.	7.	12.	17.	16.	0.	1.
KIDNEY	0	12.	12.	19.	20.	30.	20.	0.	0.
	1	13.	4.	17.	21.	35.	22.	0.	2.
	10	11.	9.	21.	15.	27.	22.	2.	1.
	100	17.	10.	15.	27.	29.	37.	0.	0.
BRAIN	0	10.	6.	10.	14.	12.	13.	0.	1.
	1	5.	7.	3.	6.	10.	10.	0.	0.
	10	5.	5.	4.	12.	24.	19.	0.	0.
	100	7.	10.	9.	11.	17.	7.	1.	0.
SPLEEN	0	15.	6.	8.	7.	15.	20.	1.	1.
	1	9.	12.	14.	6.	19.	15.	0.	0.
	10	5.	6.	15.	5.	21.	20.	1.	0.
	100	9.	10.	9.	2.	21.	24.	1.	0.
LUNG	0	12.	13.	7.	14.	11.	23.	0.	0.
	1	9.	9.	5.	10.	10.	9.	0.	0.
	10	20.	12.	7.	8.	19.	17.	0.	0.
	100	11.	5.	12.	11.	17.	20.	0.	0.
STOMACH	0	5.	9.	3.	7.	10.	12.	0.	0.
	1	3.	14.	6.	9.	17.	22.	0.	0.
	10	6.	6.	7.	7.	20.	18.	0.	0.
	100	12.	7.	10.	13.	13.	26.	1.	0.
BLOOD	0	7.	8.	5.	6.	14.	14.	1.	0.
	1	6.	10.	8.	9.	18.	13.	0.	0.
	10	6.	6.	4.	10.	17.	20.	1.	1.
	100	7.	5.	14.	2.	13.	14.	0.	0.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Penicillin G (NC-15)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1950	
NONE	0	9.	[illegible]	4.	4.	11.	11.	0.	0.
	1	7.	[illegible]	5.	4.	17.	7.	0.	0.
	10	7.	3.	3.	1.	11.	3.	0.	1.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LIVER	0	9.	0.	14.	0.	27.	24.	2.	1.
	1	12.	9.	16.	9.	16.	23.	0.	3.
	10	8.	3.	8.	2.	32.	16.	1.	3.
	100	3.	1.	1.	1.	1.	1.	2.	1.
KIDNEY	0	14.	14.	9.	13.	14.	10.	0.	0.
	1	12.	11.	16.	9.	29.	22.	1.	2.
	10	12.	10.	2.	2.	25.	19.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
BRAIN	0	8.	13.	9.	7.	12.	16.	0.	1.
	1	8.	7.	7.	10.	9.	12.	0.	0.
	10	0.	4.	4.	0.	5.	0.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
SPLEEN	0	7.	11.	6.	9.	13.	13.	0.	0.
	1	9.	9.	11.	0.	17.	16.	1.	0.
	10	0.	0.	2.	1.	10.	13.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LUNG	0	6.	10.	9.	3.	20.	10.	0.	0.
	1	7.	6.	3.	11.	21.	13.	0.	0.
	10	10.	3.	4.	0.	17.	11.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
STOMACH	0	6.	7.	2.	4.	12.	13.	1.	0.
	1	7.	11.	7.	7.	9.	8.	0.	0.
	10	0.	17.	0.	1.	8.	9.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
BLOOD	0	7.	10.	6.	4.	13.	20.	0.	1.
	1	9.	4.	5.	5.	10.	10.	0.	0.
	10	2.	4.	0.	0.	7.	10.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.

Pentachlorophenol (NC-48)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	20.	13.	7.	9.	33.	34.	63.	88.
	1	14.	12.	5.	8.	21.	33.	60.	99.
	10	19.	4.	3.	7.	44.	30.	107.	103.
	100	11.	11.	7.	5.	16.	9.	33.	75.
LIVER	0	19.	11.	12.	14.	52.	49.	133.	114.
	1	12.	19.	14.	12.	44.	40.	117.	84.
	10	13.	14.	11.	9.	64.	44.	110.	127.
	100	13.	7.	2.	4.	51.	40.	159.	74.
KIDNEY	0	25.	16.	20.	16.	49.	48.	183.	190.
	1	19.	16.	12.	16.	58.	61.	199.	168.
	10	26.	18.	22.	16.	43.	53.	140.	188.
	100	14.	20.	14.	6.	57.	34.	145.	130.
BRAIN	0	23.	14.	9.	10.	46.	34.	135.	127.
	1	17.	14.	8.	6.	31.	36.	121.	140.
	10	15.	14.	4.	12.	41.	34.	143.	142.
	100	13.	10.	2.	3.	26.	34.	103.	91.
SPLEEN	0	11.	15.	23.	11.	36.	40.	67.	68.
	1	16.	12.	6.	9.	54.	55.	70.	83.
	10	17.	8.	15.	7.	65.	49.	83.	100.
	100	5.	18.	3.	8.	23.	31.	62.	72.
LUNG	0	20.	16.	11.	10.	68.	63.	70.	93.
	1	12.	9.	8.	13.	55.	66.	70.	88.
	10	16.	16.	10.	17.	30.	49.	111.	110.
	100	29.	17.	3.	4.	69.	30.	73.	77.
STOMACH	0	23.	17.	7.	13.	44.	31.	94.	104.
	1	11.	10.	9.	8.	31.	37.	78.	79.
	10	3.	7.	7.	6.	30.	30.	82.	106.
	100	14.	6.	4.	1.	64.	31.	45.	43.
BLOOD	0	4.	8.	9.	1.	30.	18.	81.	87.
	1	10.	9.	9.	6.	27.	26.	104.	94.
	10	8.	4.	7.	5.	19.	20.	97.	79.
	100	5.	10.	3.	8.	25.	27.	90.	70.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

o-Phenylenediamine (NC-26)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1950	
NONE	0	13.	7.	6.	5.	10.	2.	2.	0.
	1	25.	15.	2.	10.	13.	10.	2.	0.
	10	12.	12.	5.	4.	9.	7.	0.	4.
	100	10.	8.	5.	11.	10.	11.	0.	0.
LIVER	0	11.	21.	0.	7.	10.	18.	1.	0.
	1	16.	22.	5.	4.	11.	17.	0.	1.
	10	13.	16.	6.	5.	10.	19.	1.	0.
	100	12.	15.	9.	9.	14.	12.	2.	1.
KIDNEY	0	15.	15.	2.	6.	27.	20.	1.	0.
	1	15.	14.	0.	16.	21.	19.	2.	1.
	10	15.	21.	10.	7.	15.	24.	0.	0.
	100	22.	14.	20.	13.	20.	10.	1.	3.
BRAIN	0	30.	16.	5.	5.	11.	12.	0.	0.
	1	20.	23.	5.	4.	8.	28.	0.	0.
	10	15.	22.	7.	3.	10.	10.	0.	0.
	100	9.	18.	12.	7.	11.	16.	0.	1.
SPLEEN	0	17.	20.	0.	6.	0.	0.	0.	0.
	1	22.	18.	7.	0.	17.	23.	0.	0.
	10	14.	30.	0.	9.	10.	14.	2.	1.
	100	11.	17.	7.	7.	12.	13.	0.	0.
LUNG	0	19.	20.	3.	3.	17.	11.	0.	0.
	1	32.	17.	10.	0.	10.	10.	2.	1.
	10	22.	21.	4.	7.	15.	8.	0.	0.
	100	14.	19.	9.	3.	21.	19.	0.	0.
STOMACH	0	30.	20.	3.	10.	10.	19.	1.	7.
	1	29.	18.	9.	9.	15.	18.	0.	1.
	10	26.	39.	9.	11.	19.	17.	0.	1.
	100	17.	19.	0.	4.	0.	0.	1.	4.
BLOOD	0	17.	20.	4.	9.	10.	10.	1.	1.
	1	16.	10.	4.	4.	6.	9.	0.	1.
	10	19.	13.	3.	3.	10.	13.	0.	1.
	100	11.	16.	3.	7.	12.	11.	3.	0.

Pyridine (NC-56)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	6.	7.	3.	30.	14.	100.	[illegible]
	1	3.	0.	0.	8.	14.	11.	83.	81.
	10	7.	8.	7.	6.	22.	10.	110.	121.
	100	9.	10.	4.	7.	14.	15.	137.	136.
LIVER	0	15.	12.	8.	6.	19.	10.	106.	120.
	1	9.	11.	9.	7.	30.	11.	130.	141.
	10	9.	11.	9.	8.	11.	14.	130.	110.
	100	11.	15.	11.	7.	24.	20.	141.	140.
KIDNEY	0	13.	10.	13.	14.	10.	10.	176.	187.
	1	17.	16.	16.	6.	16.	22.	212.	223.
	10	8.	12.	14.	12.	20.	33.	172.	170.
	100	5.	6.	12.	6.	23.	16.	173.	170.
BRAIN	0	7.	10.	7.	5.	30.	17.	90.	120.
	1	13.	13.	9.	8.	14.	16.	137.	122.
	10	9.	8.	10.	5.	11.	10.	115.	106.
	100	10.	10.	6.	6.	37.	19.	130.	113.
SPLEEN	0	5.	10.	9.	5.	10.	10.	108.	104.
	1	8.	9.	7.	8.	17.	19.	154.	101.
	10	11.	4.	4.	10.	10.	18.	136.	117.
	100	7.	12.	10.	16.	23.	23.	102.	109.
LUNG	0	11.	0.	13.	7.	21.	21.	174.	101.
	1	15.	10.	9.	6.	30.	20.	161.	120.
	10	9.	13.	7.	6.	27.	22.	171.	147.
	100	10.	9.	5.	11.	23.	10.	159.	132.
STOMACH	0	9.	18.	0.	10.	31.	26.	78.	139.
	1	13.	7.	6.	7.	11.	9.	117.	123.
	10	17.	9.	9.	6.	30.	21.	110.	112.
	100	8.	17.	7.	6.	31.	22.	106.	111.
BLOOD	0	8.	3.	8.	6.	10.	13.	130.	170.
	1	7.	6.	8.	3.	19.	23.	120.	161.
	10	8.	3.	8.	14.	20.	19.	98.	128.
	100	6.	3.	8.	6.	21.	18.	105.	101.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Riboflavin (NC-16)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	8.	10.	2.	5.	14.	6.	0.	0.
	1	8.	9.	4.	5.	10.	11.	0.	0.
	10	12.	9.	4.	5.	9.	3.	0.	0.
	100	8.	7.	1.	0.	0.	0.	1.	0.
LIVER	0	9.	14.	3.	7.	10.	12.	3.	1.
	1	15.	0.	7.	3.	12.	7.	0.	0.
	10	9.	11.	0.	5.	12.	10.	3.	0.
	100	9.	5.	9.	5.	10.	11.	0.	0.
KIDNEY	0	16.	16.	10.	14.	8.	10.	0.	0.
	1	7.	17.	13.	12.	12.	14.	0.	2.
	10	8.	0.	7.	7.	13.	10.	1.	1.
	100	12.	11.	11.	5.	10.	11.	0.	0.
BRAIN	0	14.	10.	6.	2.	13.	11.	0.	0.
	1	7.	9.	8.	0.	6.	6.	0.	0.
	10	4.	12.	6.	4.	12.	10.	0.	0.
	100	11.	20.	4.	2.	7.	0.	0.	0.
SPLEEN	0	10.	5.	9.	7.	10.	12.	0.	0.
	1	6.	7.	7.	3.	12.	0.	0.	0.
	10	17.	11.	5.	6.	14.	13.	0.	0.
	100	15.	7.	6.	3.	5.	0.	0.	0.
LUNG	0	11.	6.	2.	7.	7.	17.	1.	1.
	1	13.	12.	5.	3.	7.	7.	0.	0.
	10	6.	8.	1.	5.	12.	17.	2.	0.
	100	20.	8.	4.	4.	8.	8.	1.	1.
STOMACH	0	10.	13.	8.	4.	0.	0.	0.	0.
	1	11.	9.	7.	7.	10.	19.	0.	2.
	10	11.	11.	1.	6.	9.	14.	0.	0.
	100	6.	8.	4.	6.	0.	0.	0.	0.
BLOOD	0	6.	7.	4.	3.	6.	14.	0.	0.
	1	12.	9.	6.	4.	8.	8.	0.	2.
	10	8.	3.	6.	1.	0.	0.	2.	0.
	100	8.	8.	3.	5.	9.	12.	0.	0.

Saccharin (NC-25)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	3.	3.	10.	10.	6.	13.	13.	10.
	1	10.	5.	11.	16.	15.	9.	9.	6.
	10	8.	8.	16.	12.	3.	11.	6.	10.
	100	5.	4.	25.	14.	8.	8.	4.	6.
LIVER	0	2.	4.	19.	23.	10.	22.	8.	6.
	1	5.	6.	17.	20.	8.	10.	10.	10.
	10	10.	12.	20.	21.	13.	10.	7.	13.
	100	6.	11.	11.	19.	14.	19.	13.	10.
KIDNEY	0	1.	1.	8.	19.	17.	14.	10.	15.
	1	9.	4.	14.	19.	21.	15.	14.	13.
	10	9.	4.	13.	20.	12.	13.	16.	6.
	100	1.	9.	19.	17.	16.	12.	7.	8.
BRAIN	0	17.	8.	10.	11.	7.	7.	9.	9.
	1	0.	8.	14.	14.	6.	7.	2.	13.
	10	10.	5.	8.	7.	8.	7.	9.	8.
	100	3.	4.	23.	13.	6.	6.	11.	3.
SPLEEN	0	3.	12.	33.	29.	7.	15.	7.	11.
	1	13.	12.	14.	27.	10.	10.	7.	10.
	10	13.	10.	12.	25.	12.	21.	9.	17.
	100	5.	1.	15.	22.	15.	20.	0.	10.
LUNG	0	5.	10.	21.	24.	2.	13.	7.	6.
	1	0.	8.	5.	13.	5.	11.	9.	11.
	10	1.	4.	10.	10.	5.	9.	9.	4.
	100	12.	4.	14.	23.	0.	0.	6.	9.
STOMACH	0	9.	6.	23.	29.	9.	12.	12.	15.
	1	10.	10.	23.	29.	15.	7.	10.	12.
	10	8.	17.	15.	24.	19.	6.	5.	11.
	100	9.	8.	25.	10.	20.	9.	0.	9.
BLOOD	0	5.	1.	28.	19.	8.	10.	7.	7.
	1	0.	0.	16.	22.	9.	13.	5.	5.
	10	9.	1.	20.	17.	9.	11.	7.	3.
	100	5.	6.	13.	12.	27.	14.	12.	6.

APPENDIX B-1 (Continued)

Results of *Salmonella* Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Salicylic Acid (NC-17)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	9.	9.	6.	6.	9.	7.	0.	2.
	1	6.	7.	6.	4.	2.	6.	1.	0.
	10	6.	5.	3.	2.	3.	4.	0.	0.
	100	0.	0.	4.	1.	1.	2.	0.	0.
LIVER	0	10.	8.	4.	4.	22.	14.	0.	1.
	1	10.	15.	3.	8.	15.	11.	0.	0.
	10	10.	12.	11.	9.	21.	12.	0.	0.
	100	10.	7.	8.	2.	17.	16.	0.	2.
KIDNEY	0	12.	10.	10.	12.	22.	12.	0.	1.
	1	7.	6.	8.	10.	11.	10.	0.	0.
	10	9.	9.	12.	6.	14.	10.	0.	0.
	100	9.	5.	9.	2.	12.	9.	0.	0.
BRAIN	0	16.	9.	1.	8.	23.	10.	0.	0.
	1	8.	5.	3.	4.	7.	14.	1.	0.
	10	4.	8.	7.	11.	9.	9.	1.	1.
	100	5.	4.	3.	5.	5.	11.	0.	0.
SPLEEN	0	2.	8.	8.	5.	14.	10.	2.	1.
	1	6.	6.	3.	9.	12.	8.	0.	0.
	10	5.	7.	3.	7.	7.	12.	1.	0.
	100	2.	4.	5.	3.	9.	9.	0.	0.
LUNG	0	9.	9.	7.	9.	12.	10.	1.	0.
	1	11.	11.	3.	4.	14.	13.	0.	0.
	10	7.	11.	2.	4.	17.	8.	3.	6.
	100	2.	5.	2.	2.	7.	3.	0.	0.
STOMACH	0	3.	8.	9.	7.	16.	13.	2.	1.
	1	10.	8.	4.	8.	10.	10.	2.	0.
	10	9.	8.	7.	5.	8.	23.	4.	0.
	100	2.	9.	4.	1.	8.	13.	0.	0.
BLOOD	0	11.	2.	9.	2.	9.	7.	1.	1.
	1	3.	1.	3.	2.	3.	2.	1.	0.
	10	5.	2.	4.	4.	6.	10.	2.	0.
	100	4.	4.	1.	0.	4.	7.	0.	2.

Cis-Stilbene (NC-37)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	3.	7.	5.	7.	14.	22.	193.	177.
	1	4.	6.	4.	6.	16.	19.	186.	160.
	10	8.	9.	7.	4.	20.	16.	136.	144.
	100	8.	5.	9.	1.	15.	11.	174.	180.
LIVER	0	6.	6.	10.	4.	17.	20.	200.	180.
	1	10.	4.	7.	9.	22.	22.	150.	200.
	10	11.	5.	9.	10.	20.	25.	220.	150.
	100	7.	7.	9.	11.	21.	26.	130.	210.
KIDNEY	0	7.	7.	8.	12.	21.	20.	190.	254.
	1	6.	13.	15.	10.	31.	28.	202.	244.
	10	12.	10.	13.	14.	26.	28.	180.	192.
	100	9.	10.	14.	11.	26.	20.	270.	270.
BRAIN	0	7.	14.	9.	7.	17.	23.	193.	169.
	1	17.	17.	8.	11.	30.	20.	294.	227.
	10	8.	4.	10.	8.	32.	37.	193.	217.
	100	11.	10.	4.	13.	22.	26.	185.	290.
SPLEEN	0	15.	23.	4.	6.	43.	44.	190.	277.
	1	8.	9.	7.	14.	34.	34.	190.	138.
	10	14.	15.	12.	4.	37.	37.	191.	182.
	100	10.	10.	10.	8.	32.	24.	160.	112.
LUNG	0	32.	11.	8.	7.	47.	55.	220.	192.
	1	17.	7.	5.	6.	59.	47.	177.	184.
	10	13.	8.	7.	13.	53.	57.	221.	161.
	100	25.	25.	11.	8.	50.	60.	240.	246.
STOMACH	0	4.	7.	10.	11.	32.	20.	149.	134.
	1	15.	13.	5.	4.	19.	31.	149.	139.
	10	16.	9.	5.	7.	19.	18.	147.	180.
	100	12.	8.	6.	17.	20.	27.	182.	211.
BLOOD	0	9.	9.	12.	8.	18.	29.	184.	193.
	1	10.	12.	5.	10.	17.	30.	293.	216.
	10	12.	6.	6.	7.	16.	30.	206.	222.
	100	12.	11.	10.	13.	31.	22.	373.	203.

APPENDIX B-1 (Continued)

Results of Salmonella Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Simazine (NC-58)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	1.	[illegible]	2.	10.	14.	69.	67.
	1	4.	2.	1.	4.	7.	29.	98.	117.
	10	3.	3.	2.	3.	9.	13.	120.	114.
	100	4.	6.	3.	1.	14.	13.	102.	112.
LIVER	0	4.	7.	[illegible]	7.	14.	16.	140.	130.
	1	5.	3.	[illegible]	3.	10.	17.	100.	90.
	10	3.	0.	3.	6.	14.	13.	132.	112.
	100	5.	6.	2.	4.	13.	16.	80.	104.
KIDNEY	0	7.	10.	5.	6.	20.	18.	88.	100.
	1	3.	9.	3.	6.	16.	19.	110.	92.
	10	4.	5.	4.	3.	15.	21.	112.	142.
	100	5.	6.	9.	4.	14.	18.	134.	160.
BRAIN	0	8.	7.	2.	3.	17.	17.	110.	148.
	1	1.	9.	4.	4.	20.	11.	86.	192.
	10	5.	8.	6.	4.	14.	22.	124.	92.
	100	7.	4.	4.	6.	11.	12.	110.	124.
SPLEEN	0	4.	7.	3.	8.	18.	13.	170.	130.
	1	6.	2.	9.	6.	6.	22.	106.	129.
	10	6.	5.	3.	4.	10.	17.	90.	110.
	100	4.	8.	9.	4.	18.	13.	110.	133.
LUNG	0	7.	6.	9.	3.	14.	10.	110.	110.
	1	9.	9.	4.	6.	6.	6.	82.	112.
	10	6.	9.	1.	3.	10.	9.	100.	90.
	100	6.	4.	1.	6.	11.	21.	106.	130.
STOMACH	0	6.	6.	5.	6.	10.	14.	102.	90.
	1	9.	7.	4.	5.	19.	21.	84.	112.
	10	6.	0.	6.	4.	17.	10.	92.	103.
	100	6.	7.	3.	3.	13.	12.	90.	102.
BLOOD	0	3.	3.	4.	3.	13.	17.	90.	80.
	1	7.	[illegible]	4.	7.	10.	11.	112.	100.
	10	6.	4.	9.	6.	10.	10.	102.	113.
	100	3.	6.	5.	3.	9.	12.	90.	113.

Sulfaguanidine (NC-18)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	10.	8.	6.	4.	14.	10.	0.	1.
	1	11.	12.	6.	4.	9.	7.	1.	1.
	10	10.	17.	3.	4.	14.	20.	0.	0.
	100	11.	5.	6.	7.	10.	25.	0.	0.
LIVER	0	10.	12.	7.	14.	20.	20.	0.	3.
	1	4.	9.	7.	13.	27.	25.	1.	1.
	10	12.	8.	7.	5.	24.	25.	1.	0.
	100	5.	8.	5.	9.	33.	20.	0.	1.
KIDNEY	0	20.	20.	19.	12.	53.	29.	2.	2.
	1	8.	13.	20.	26.	34.	50.	2.	1.
	10	10.	12.	14.	21.	46.	35.	2.	2.
	100	14.	17.	18.	10.	47.	41.	1.	0.
BRAIN	0	19.	26.	8.	5.	23.	21.	1.	0.
	1	21.	23.	7.	6.	18.	20.	1.	0.
	10	15.	10.	1.	5.	20.	14.	1.	0.
	100	11.	10.	6.	5.	17.	12.	0.	1.
SPLEEN	0	17.	18.	10.	14.	22.	18.	1.	1.
	1	4.	16.	10.	8.	28.	19.	1.	0.
	10	15.	27.	9.	16.	17.	35.	0.	0.
	100	12.	15.	9.	6.	11.	13.	1.	2.
LUNG	0	29.	24.	26.	37.	14.	9.	0.	1.
	1	27.	31.	30.	19.	21.	19.	2.	2.
	10	27.	17.	37.	44.	17.	20.	2.	0.
	100	11.	20.	24.	64.	40.	30.	3.	4.
STOMACH	0	34.	22.	8.	12.	17.	21.	0.	0.
	1	16.	18.	6.	3.	21.	29.	1.	1.
	10	15.	17.	5.	14.	29.	20.	0.	0.
	100	22.	20.	9.	3.	13.	30.	2.	1.
BLOOD	0	10.	14.	5.	7.	8.	8.	0.	1.
	1	10.	16.	6.	4.	27.	20.	3.	1.
	10	13.	14.	2.	4.	12.	21.	1.	2.
	100	12.	13.	6.	9.	10.	27.	2.	1.

APPENDIX B-1 (Continued)

Results of _Salmonella_ Test on Noncarcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Tetracycline (NC-19)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	10.	15.	6.	6.	8.	19.	0.	0.
	1	8.	17.	9.	13.	9.	10.	0.	0.
	10	4.	2.	4.	5.	4.	5.	0.	3.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LIVER									
	0	17.	10.	9.	5.	13.	10.	0.	0.
	1	14.	11.	6.	12.	12.	10.	0.	0.
	10	7.	0.	11.	0.	4.	7.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
KIDNEY									
	0	15.	14.	14.	11.	22.	14.	0.	1.
	1	12.	16.	9.	15.	10.	17.	1.	2.
	10	8.	9.	10.	0.	9.	9.	0.	1.
	100	2.	0.	1.	1.	3.	3.	0.	0.
BRAIN									
	0	8.	20.	7.	4.	11.	12.	0.	2.
	1	7.	12.	4.	7.	10.	10.	0.	0.
	10	6.	7.	3.	6.	3.	2.	0.	0.
	100	0.	0.	0.	0.	3.	0.	0.	0.
SPLEEN									
	0	13.	10.	7.	9.	14.	20.	0.	0.
	1	12.	12.	12.	4.	17.	13.	0.	0.
	10	6.	5.	5.	1.	4.	4.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LUNG									
	0	29.	24.	24.	37.	14.	9.	0.	1.
	1	12.	13.	15.	20.	10.	13.	0.	0.
	10	9.	3.	13.	10.	1.	3.	0.	0.
	100	0.	0.	0.	0.	6.	0.	0.	0.
STOMACH									
	0	4.	7.	3.	10.	7.	11.	0.	0.
	1	15.	12.	3.	6.	13.	22.	0.	0.
	10	10.	6.	7.	2.	6.	4.	0.	[illegible]
	100	0.	6.	3.	0.	2.	5.	1.	[illegible]
BLOOD									
	0	9.	6.	0.	4.	10.	10.	0.	0.
	1	5.	9.	5.	6.	10.	14.	1.	1.
	10	4.	4.	2.	2.	7.	3.	0.	0.
	100	1.	0.	0.	0.	0.	5.	0.	0.

Trifluralin (NC-20)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	5.	9.	9.	9.	7.	11.	0.	0.
	1	12.	6.	2.	1.	14.	10.	0.	2.
	10	6.	9.	5.	1.	16.	14.	0.	0.
	100	6.	6.	4.	4.	11.	8.	0.	0.
LIVER									
	0	13.	6.	9.	7.	30.	12.	0.	0.
	1	14.	11.	5.	4.	25.	19.	2.	2.
	10	5.	7.	8.	5.	17.	10.	0.	0.
	100	6.	0.	4.	6.	13.	27.	2.	0.
KIDNEY									
	0	15.	3.	10.	10.	23.	24.	0.	1.
	1	15.	16.	7.	6.	21.	22.	1.	0.
	10	2.	10.	13.	17.	10.	17.	1.	7.
	100	12.	10.	10.	9.	11.	20.	1.	0.
BRAIN									
	0	5.	9.	7.	7.	14.	10.	1.	0.
	1	11.	11.	4.	4.	8.	10.	1.	0.
	10	9.	11.	5.	6.	15.	15.	0.	1.
	100	8.	15.	4.	4.	13.	25.	1.	3.
SPLEEN									
	0	10.	11.	10.	6.	24.	18.	0.	0.
	1	9.	12.	6.	6.	19.	15.	2.	0.
	10	10.	9.	2.	5.	19.	17.	0.	0.
	100	5.	6.	5.	9.	16.	10.	0.	0.
LUNG									
	0	29.	24.	24.	37.	14.	9.	0.	1.
	1	13.	15.	20.	20.	22.	13.	1.	0.
	10	12.	15.	40.	30.	10.	10.	1.	1.
	100	10.	10.	25.	20.	12.	14.	1.	4.
STOMACH									
	0	20.	20.	9.	2.	13.	14.	0.	2.
	1	8.	9.	1.	5.	19.	22.	0.	0.
	10	19.	16.	7.	5.	10.	21.	0.	0.
	100	6.	9.	11.	1.	13.	16.	0.	0.
BLOOD									
	0	3.	3.	7.	3.	22.	19.	0.	0.
	1	13.	10.	5.	6.	20.	19.	1.	1.
	10	10.	4.	9.	3.	14.	13.	0.	0.
	100	10.	4.	5.	7.	11.	11.	0.	0.

APPENDIX B-2

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Acetamide (C-31)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	9.	14.	9.	5.	13.	19.	0.	0.
	1	11.	12.	9.	6.	11.	12.	1.	1.
	10	20.	12.	9.	7.	17.	17.	1.	2.
	100	17.	9.	11.	5.	10.	11.	0.	0.
LIVER	0	9.	13.	9.	8.	22.	22.	3.	2.
	1	6.	8.	9.	6.	17.	19.	0.	6.
	10	13.	3.	19.	7.	22.	19.	0.	1.
	100	6.	9.	13.	10.	20.	24.	1.	1.
KIDNEY	0	25.	19.	12.	7.	13.	37.	1.	0.
	1	18.	13.	9.	9.	33.	36.	1.	1.
	10	10.	13.	10.	15.	28.	34.	3.	0.
	100	19.	13.	5.	10.	21.	25.	0.	0.
BRAIN	0	10.	8.	3.	6.	19.	14.	2.	0.
	1	13.	9.	0.	5.	10.	16.	1.	2.
	10	26.	22.	3.	7.	16.	21.	2.	0.
	100	13.	15.	6.	6.	10.	17.	2.	0.
SPLEEN	0	21.	10.	10.	9.	18.	29.	3.	9.
	1	16.	11.	15.	10.	19.	34.	7.	4.
	10	20.	16.	6.	12.	18.	15.	0.	7.
	100	15.	12.	10.	12.	18.	22.	6.	6.
LUNG	0	29.	24.	24.	31.	14.	9.	0.	1.
	1	12.	12.	42.	34.	20.	35.	2.	2.
	10	4.	11.	41.	39.	17.	16.	3.	4.
	100	14.	22.	35.	37.	20.	10.	1.	6.
STOMACH	0	10.	12.	3.	8.	22.	17.	0.	0.
	1	13.	13.	2.	6.	26.	21.	1.	0.
	10	12.	11.	5.	13.	17.	24.	0.	0.
	100	9.	11.	4.	2.	20.	14.	0.	0.
BLOOD	0	6.	8.	4.	7.	13.	26.	0.	0.
	1	6.	6.	5.	10.	13.	18.	1.	1.
	10	5.	8.	1.	4.	17.	13.	0.	1.
	100	7.	5.	4.	6.	13.	20.	0.	0.

2-Acetamidofluorene (C-24)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	29.	56.	4.	3.	8.	9.	0.	0.
	1	63.	53.	19.	8.	35.	26.	0.	3.
	10	42.	65.	6.	5.	16.	20.	0.	0.
	100	44.	25.	10.	4.	39.	45.	0.	2.
LIVER	0	39.	39.	29.	29.	32.	18.	1.	2.
	1	32.	32.	39.	33.	186.	83.	5.	1.
	10	34.	38.	32.	35.	5060.	1210.	4.	1.
	100	37.	55.	62.	87.	10230.	5940.	2.	6.
KIDNEY	0	19.	50.	20.	28.	58.	47.	3.	1.
	1	52.	64.	32.	30.	54.	93.	2.	3.
	10	68.	78.	34.	42.	58.	70.	6.	6.
	100	56.	63.	32.	21.	182.	167.	3.	2.
BRAIN	0	38.	28.	15.	9.	27.	17.	4.	3.
	1	47.	73.	19.	25.	39.	37.	2.	8.
	10	48.	48.	17.	29.	65.	50.	3.	5.
	100	30.	24.	12.	10.	724.	367.	3.	4.
SPLEEN	0	68.	95.	42.	42.	89.	92.	17.	17.
	1	67.	96.	65.	20.	63.	44.	9.	4.
	10	40.	99.	38.	22.	61.	91.	8.	12.
	100	68.	94.	45.	44.	46.	53.	20.	22.
LUNG	0	57.	49.	23.	19.	45.	43.	1.	3.
	1	49.	35.	22.	22.	53.	53.	9.	6.
	10	42.	44.	19.	13.	190.	173.	9.	5.
	100	50.	59.	23.	26.	1021.	2176.	4.	2.
STOMACH	0	58.	45.	14.	10.	27.	13.	1.	2.
	1	57.	42.	8.	8.	28.	17.	1.	1.
	10	51.	50.	5.	11.	21.	16.	2.	2.
	100	48.	53.	11.	10.	23.	23.	2.	2.
BLOOD	0	55.	41.	5.	5.	13.	27.	0.	0.
	1	18.	24.	10.	12.	18.	8.	2.	0.
	10	24.	35.	10.	4.	25.	24.	1.	3.
	100	46.	45.	14.	8.	24.	19.	5.	0.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

N-Acetoxy-2-fluorenyl Acetamide (C-45)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	4.	5.	9.	4.	15.	8.	140.	122.
	1	3.	6.	10.	5.	14.	19.	137.	160.
	10	4.	6.	3.	6.	27.	31.	126.	132.
	100	5.	4.	11.	8.	110.	125.	146.	133.
LIVER	0	10.	10.	4.	7.	24.	11.	234.	202.
	1	12.	12.	7.	16.	2808.	2216.	196.	183.
	10	18.	11.	24.	23.	5346.	5192.	650.	1106.
	100	20.	17.	79.	97.	6642.	7319.	1196.	1232.
KIDNEY	0	10.	3.	7.	9.	16.	21.	130.	197.
	1	14.	14.	7.	8.	47.	30.	292.	277.
	10	18.	17.	16.	17.	1616.	1026.	367.	404.
	100	20.	24.	29.	93.	3132.	2763.	1026.	962.
BRAIN	0	3.	6.	9.	2.	10.	17.	147.	163.
	1	10.	13.	13.	11.	41.	61.	290.	282.
	10	7.	14.	10.	15.	130.	232.	532.	397.
	100	9.	13.	19.	12.	700.	704.	700.	764.
SPLEEN	0	7.	15.	5.	10.	11.	22.	188.	248.
	1	8.	9.	5.	7.	59.	41.	148.	191.
	10	17.	8.	6.	6.	228.	192.	173.	168.
	100	13.	10.	13.	9.	890.	916.	294.	264.
LUNG	0	7.	7.	4.	9.	12.	13.	141.	148.
	1	15.	9.	11.	12.	30.	38.	232.	294.
	10	14.	13.	28.	21.	61.	140.	335.	313.
	100	13.	16.	68.	74.	728.	672.	468.	532.
STOMACH	0	11.	11.	6.	7.	9.	14.	163.	183.
	1	8.	17.	7.	14.	32.	39.	302.	297.
	10	8.	9.	11.	10.	88.	81.	314.	339.
	100	10.	16.	24.	17.	804.	674.	620.	470.
BLOOD	0	6.	5.	7.	4.	12.	16.	213.	194.
	1	15.	8.	6.	5.	19.	24.	301.	295.
	10	7.	9.	13.	10.	46.	54.	304.	314.
	100	9.	13.	97.	134.	439.	558.	939.	690.

Aflatoxin (C-22)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	10.	25.	6.	0.	2.	4.	1.	0.
	1	27.	31.	2.	3.	1.	1.	0.	0.
	10	22.	13.	3.	2.	11.	0.	0.	0.
	100	14.	7.	10.	2.	23.	27.	0.	0.
LIVER	0	20.	26.	4.	5.	9.	5.	2.	2.
	1	11.	10.	2.	11.	1350.	1982.	0.	0.
	10	65.	67.	0.	0.	0.	2.	0.	1.
	100	8.	6.	0.	0.	0.	0.	1.	0.
KIDNEY	0	47.	37.	10.	8.	12.	9.	0.	1.
	1	43.	50.	7.	10.	13.	16.	0.	0.
	10	33.	38.	7.	7.	20.	11.	0.	0.
	100	14.	11.	5.	4.	71.	64.	0.	0.
BRAIN	0	22.	34.	3.	4.	9.	9.	0.	0.
	1	15.	18.	5.	3.	8.	9.	0.	0.
	10	39.	40.	2.	3.	11.	14.	0.	0.
	100	19.	12.	10.	6.	37.	42.	0.	0.
SPLEEN	0	20.	21.	9.	3.	8.	12.	0.	0.
	1	16.	21.	13.	7.	9.	12.	1.	0.
	10	16.	19.	5.	8.	14.	19.	0.	2.
	100	13.	17.	9.	3.	29.	31.	0.	1.
LUNG	0	31.	31.	4.	5.	10.	8.	0.	0.
	1	21.	25.	5.	6.	11.	18.	0.	0.
	10	30.	30.	3.	11.	22.	17.	0.	0.
	100	18.	16.	3.	4.	34.	30.	0.	0.
STOMACH	0	19.	17.	2.	3.	16.	13.	1.	0.
	1	31.	34.	2.	7.	5.	7.	0.	0.
	10	20.	15.	3.	8.	22.	16.	0.	0.
	100	14.	12.	10.	15.	83.	58.	0.	0.
BLOOD	0	12.	9.	5.	6.	10.	13.	0.	2.
	1	2.	8.	2.	4.	14.	11.	0.	1.
	10	9.	5.	4.	7.	17.	20.	0.	0.
	100	2.	4.	6.	2.	35.	47.	0.	0.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

4-Aminobiphenyl (C-19)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	3.	9.	4.	8.	2.	11.	0.	0.
	1	6.	7.	6.	5.	18.	16.	1.	1.
	10	6.	9.	3.	7.	7.	8.	0.	0.
	100	6.	5.	3.	8.	1.	4.	0.	0.
LIVER	0	8.	9.	10.	8.	17.	19.	1.	0.
	1	7.	11.	6.	8.	37.	22.	0.	0.
	10	3.	6.	10.	9.	118.	130.	0.	0.
	100	11.	9.	23.	29.	317.	340.	0.	0.
KIDNEY	0	13.	11.	13.	17.	16.	20.	2.	2.
	1	12.	18.	16.	16.	22.	20.	4.	3.
	10	15.	12.	19.	14.	22.	17.	1.	1.
	100	15.	10.	7.	13.	23.	31.	3.	0.
BRAIN	0	16.	13.	5.	9.	14.	10.	1.	0.
	1	9.	10.	15.	11.	10.	11.	2.	0.
	10	11.	25.	9.	7.	17.	7.	0.	1.
	100	6.	10.	3.	6.	9.	10.	0.	0.
SPLEEN	0	21.	12.	8.	8.	19.	12.	0.	0.
	1	14.	17.	9.	5.	14.	12.	2.	0.
	10	8.	12.	11.	7.	11.	17.	1.	0.
	100	6.	7.	8.	4.	11.	18.	0.	2.
LUNG	0	12.	20.	6.	8.	16.	13.	3.	0.
	1	5.	7.	5.	6.	27.	34.	2.	0.
	10	11.	5.	8.	11.	73.	72.	1.	1.
	100	12.	17.	8.	12.	100.	104.	0.	2.
STOMACH	0	10.	10.	8.	8.	18.	14.	1.	2.
	1	9.	25.	4.	10.	23.	21.	0.	0.
	10	25.	9.	4.	5.	34.	32.	0.	2.
	100	8.	21.	4.	4.	20.	18.	0.	1.
BLOOD	0	7.	1.	3.	3.	9.	14.	0.	0.
	1	2.	4.	3.	2.	11.	16.	0.	0.
	10	5.	6.	3.	3.	11.	16.	2.	0.
	100	5.	3.	9.	5.	10.	10.	0.	0.

6-Aminochrysene (C-18)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	16.	9.	8.	5.	13.	9.	1.	0.
	1	5.	12.	13.	22.	10.	13.	0.	0.
	10	22.	11.	8.	18.	15.	10.	0.	0.
	100	9.	9.	54.	43.	31.	23.	0.	0.
LIVER	0	20.	12.	8.	13.	34.	25.	2.	1.
	1	11.	9.	40.	38.	1214.	1100.	2.	0.
	10	3.	4.	83.	123.	82.	144.	18.	9.
	100	7.	7.	24.	14.	114.	114.	0.	0.
KIDNEY	0	34.	71.	17.	18.	28.	37.	2.	0.
	1	40.	50.	165.	180.	312.	385.	1.	0.
	10	78.	47.	18.	12.	482.	600.	0.	1.
	100	48.	53.	17.	18.	945.	754.	0.	0.
BRAIN	0	34.	38.	9.	7.	20.	19.	0.	1.
	1	16.	26.	44.	42.	113.	123.	2.	0.
	10	28.	27.	84.	74.	278.	168.	1.	0.
	100	32.	27.	105.	99.	211.	192.	0.	1.
SPLEEN	0	23.	27.	4.	18.	21.	32.	0.	1.
	1	20.	28.	19.	27.	56.	51.	1.	0.
	10	19.	25.	102.	126.	214.	168.	0.	7.
	100	32.	21.	135.	137.	213.	186.	0.	6.
LUNG	0	33.	22.	7.	9.	27.	38.	0.	0.
	1	22.	24.	44.	45.	105.	88.	1.	1.
	10	25.	29.	104.	96.	251.	232.	1.	0.
	100	30.	24.	102.	73.	430.	298.	0.	0.
STOMACH	0	22.	21.	10.	7.	19.	20.	0.	1.
	1	19.	28.	58.	38.	115.	98.	2.	0.
	10	17.	11.	91.	70.	177.	150.	6.	0.
	100	27.	17.	95.	76.	230.	258.	0.	0.
BLOOD	0	17.	28.	10.	7.	18.	18.	2.	2.
	1	19.	2.	12.	18.	10.	19.	0.	0.
	10	18.	21.	19.	15.	34.	31.	3.	3.
	100	11.	19.	31.	40.	74.	47.	1.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2-Aminoanthracene (C-5)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	13.	2.	19.	9.	13.	8.	0.	0.
	1	5.	1.	9.	5.	15.	15.	0.	0.
	10	2.	2.	14.	20.	16.	15.	0.	0.
	100	14.	4.	24.	21.	10.	21.	0.	0.
LIVER									
	0	9.	7.	12.	9.	28.	26.	0.	0.
	1	41.	27.	16.	22.	104.	96.	0.	0.
	10	478.	753.	344.	285.	3380.	6354.	0.	0.
	100	316.	227.	305.	252.	4690.	4018.	0.	0.
KIDNEY									
	0	28.	18.	13.	7.	25.	30.	0.	0.
	1	98.	61.	49.	32.	213.	189.	0.	0.
	10	53.	51.	204.	186.	1330.	1298.	0.	0.
	100	138.	109.	288.	222.	1008.	549.	0.	0.
BRAIN									
	0	11.	8.	9.	8.	22.	15.	0.	0.
	1	9.	2.	6.	12.	24.	25.	0.	0.
	10	5.	4.	18.	17.	76.	83.	0.	0.
	100	5.	8.	18.	24.	72.	64.	0.	0.
SPLEEN									
	0	6.	16.	12.	3.	15.	13.	0.	0.
	1	10.	7.	11.	4.	29.	27.	0.	0.
	10	14.	14.	20.	14.	66.	57.	0.	0.
	100	17.	11.	22.	20.	101.	98.	0.	0.
LUNG									
	0	3.	3.	10.	5.	17.	11.	0.	0.
	1	143.	157.	221.	237.	2678.	1652.	0.	0.
	10	27.	23.	11.	29.	4150.	3757.	0.	0.
	100	50.	43.	43.	81.	4270.	4029.	0.	0.
STOMACH									
	0	6.	10.	11.	10.	9.	16.	0.	0.
	1	8.	8.	12.	15.	37.	35.	0.	0.
	10	8.	17.	10.	25.	100.	104.	0.	0.
	100	19.	15.	18.	27.	198.	162.	0.	0.
BLOOD									
	0	15.	10.	14.	15.	11.	13.	0.	0.
	1	5.	5.	8.	10.	14.	13.	0.	0.
	10	4.	4.	8.	3.	11.	10.	0.	0.
	100	21.	5.	16.	8.	11.	12.	0.	0.

p-Aminoazobenzene (C-55)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	1.	2.	1.	1.	8.	13.	157.	137.
	1	1.	2.	1.	2.	9.	5.	139.	123.
	10	2.	2.	4.	3.	10.	12.	132.	138.
	100	5.	3.	6.	2.	6.	6.	133.	146.
LIVER									
	0	2.	9.	4.	9.	11.	10.	147.	138.
	1	5.	7.	6.	3.	19.	12.	132.	139.
	10	2.	3.	7.	4.	32.	28.	149.	147.
	100	3.	8.	1.	2.	121.	111.	188.	163.
KIDNEY									
	0	7.	7.	8.	8.	19.	12.	136.	143.
	1	5.	3.	6.	11.	17.	16.	162.	163.
	10	8.	4.	7.	10.	22.	26.	167.	142.
	100	8.	7.	9.	6.	28.	28.	139.	194.
BRAIN									
	0	2.	6.	10.	4.	16.	11.	142.	149.
	1	4.	9.	10.	4.	9.	13.	197.	147.
	10	3.	6.	4.	5.	14.	11.	132.	149.
	100	6.	7.	6.	5.	10.	10.	123.	139.
SPLEEN									
	0	3.	9.	3.	1.	13.	17.	127.	143.
	1	5.	2.	5.	3.	12.	11.	111.	134.
	10	4.	11.	2.	2.	18.	10.	169.	132.
	100	3.	6.	4.	2.	17.	14.	156.	163.
LUNG									
	0	12.	6.	5.	5.	10.	10.	128.	143.
	1	2.	4.	3.	3.	9.	13.	161.	156.
	10	7.	6.	3.	2.	23.	17.	150.	162.
	100	2.	7.	0.	2.	10.	13.	143.	167.
STOMACH									
	0	2.	6.	4.	8.	18.	18.	156.	132.
	1	8.	12.	3.	6.	14.	23.	129.	130.
	10	8.	11.	3.	5.	11.	13.	124.	157.
	100	3.	6.	2.	5.	12.	11.	138.	159.
BLOOD									
	0	6.	6.	2.	3.	7.	10.	120.	132.
	1	3.	5.	5.	4.	6.	8.	156.	166.
	10	4.	6.	3.	5.	8.	11.	131.	145.
	100	1.	8.	5.	2.	8.	6.	130.	138.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2-Aminofluorene (C-20)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	22.	19.	13.	4.	19.	19.	0.	0.
	1	12.	9.	1.	10.	15.	15.	2.	0.
	10	8.	16.	10.	0.	23.	32.	0.	0.
	100	5.	6.	15.	6.	91.	104.	0.	0.
LIVER									
	0	14.	10.	11.	3.	20.	16.	0.	0.
	1	12.	5.	12.	8.	940.	1320.	0.	0.
	10	16.	7.	44.	58.	6105.	4015.	0.	0.
	100	17.	24.	16.	21.	8800.	6923.	0.	0.
KIDNEY									
	0	28.	8.	9.	16.	25.	10.	0.	0.
	1	11.	14.	10.	11.	63.	67.	0.	0.
	10	10.	10.	12.	12.	1595.	2100.	0.	0.
	100	7.	7.	31.	57.	2035.	3190.	0.	0.
BRAIN									
	0	9.	20.	2.	10.	15.	21.	0.	0.
	1	28.	12.	9.	5.	1320.	1265.	0.	0.
	10	24.	11.	13.	13.	3025.	3000.	0.	0.
	100	7.	12.	24.	15.	5115.	3930.	0.	0.
SPLEEN									
	0	13.	16.	4.	6.	19.	7.	1.	1.
	1	22.	21.	10.	10.	27.	36.	3.	1.
	10	10.	10.	8.	6.	71.	57.	1.	1.
	100	7.	8.	13.	18.	180.	168.	0.	0.
LUNG									
	0	16.	14.	11.	8.	17.	23.	2.	0.
	1	18.	14.	4.	6.	22.	30.	0.	0.
	10	14.	14.	8.	7.	31.	31.	2.	0.
	100	20.	13.	4.	4.	109.	135.	0.	0.
STOMACH									
	0	19.	24.	6.	7.	13.	9.	0.	0.
	1	14.	10.	9.	9.	25.	24.	0.	0.
	10	14.	14.	8.	10.	80.	103.	0.	0.
	100	12.	14.	7.	5.	560.	452.	0.	0.
BLOOD									
	0	13.	18.	8.	7.	29.	17.	0.	0.
	1	18.	8.	5.	6.	14.	14.	0.	0.
	10	14.	14.	7.	6.	8.	14.	0.	0.
	100	43.	5.	9.	9.	18.	20.	0.	0.

1-Aminopyrene (C-17)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	15.	16.	4.	5.	12.	12.	0.	1.
	1	20.	13.	15.	12.	22.	18.	0.	3.
	10	18.	16.	65.	64.	67.	65.	0.	0.
	100	29.	24.	0.	0.	0.	0.	0.	0.
LIVER									
	0	20.	27.	16.	13.	25.	19.	1.	2.
	1	16.	23.	48.	42.	88.	80.	0.	2.
	10	12.	19.	158.	184.	363.	320.	5.	0.
	100	14.	10.	643.	612.	994.	794.	1.	5.
KIDNEY									
	0	34.	38.	29.	16.	27.	37.	0.	0.
	1	27.	43.	21.	22.	42.	48.	1.	2.
	10	41.	46.	60.	57.	85.	82.	2.	0.
	100	42.	26.	516.	934.	915.	628.	0.	0.
BRAIN									
	0	22.	12.	8.	5.	17.	11.	3.	0.
	1	36.	24.	16.	22.	24.	29.	0.	0.
	10	13.	20.	35.	27.	37.	35.	1.	0.
	100	45.	45.	0.	0.	0.	0.	0.	0.
SPLEEN									
	0	28.	15.	11.	11.	22.	24.	0.	1.
	1	11.	22.	14.	14.	27.	30.	0.	0.
	10	12.	17.	30.	38.	57.	94.	1.	0.
	100	19.	28.	742.	532.	49.	37.	0.	0.
LUNG									
	0	8.	18.	8.	8.	20.	24.	0.	1.
	1	13.	14.	23.	21.	47.	38.	2.	0.
	10	22.	17.	128.	130.	199.	154.	1.	0.
	100	23.	30.	114.	117.	211.	80.	0.	0.
STOMACH									
	0	16.	10.	9.	10.	12.	14.	1.	2.
	1	18.	6.	31.	11.	32.	33.	1.	1.
	10	16.	12.	39.	37.	57.	61.	2.	0.
	100	14.	16.	0.	0.	30.	38.	0.	0.
BLOOD									
	0	16.	11.	6.	9.	18.	13.	0.	0.
	1	13.	14.	11.	5.	13.	18.	1.	0.
	10	14.	15.	3.	6.	26.	21.	0.	0.
	100	28.	13.	28.	57.	61.	48.	1.	2.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

3-Amino-1,2,4-triazole (C-21)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	7.	10.	6.	8.	19.	20.	0.	0.
	1	0.	9.	4.	6.	8.	15.	1.	2.
	10	6.	9.	4.	7.	10.	11.	2.	0.
	100	9.	3.	13.	2.	6.	10.	1.	0.
LIVER	0	11.	9.	9.	10.	21.	31.	0.	1.
	1	7.	12.	11.	7.	36.	33.	0.	1.
	10	9.	12.	13.	6.	24.	38.	0.	0.
	100	14.	17.	6.	9.	71.	30.	3.	2.
KIDNEY	0	16.	15.	13.	12.	21.	24.	0.	2.
	1	17.	11.	16.	15.	20.	31.	2.	0.
	10	17.	16.	22.	21.	33.	21.	1.	1.
	100	13.	19.	14.	71.	27.	32.	3.	0.
BRAIN	0	6.	9.	5.	5.	21.	10.	1.	0.
	1	8.	12.	6.	1.	15.	25.	0.	2.
	10	4.	9.	8.	9.	18.	13.	0.	0.
	100	5.	15.	10.	10.	22.	25.	0.	0.
SPLEEN	0	28.	25.	32.	30.	58.	49.	16.	24.
	1	34.	34.	28.	27.	52.	49.	11.	21.
	10	28.	29.	33.	20.	51.	71.	19.	20.
	100	23.	31.	35.	32.	40.	44.	19.	18.
LUNG	0	11.	7.	6.	8.	17.	18.	1.	1.
	1	15.	12.	11.	7.	11.	20.	2.	3.
	10	8.	11.	15.	15.	24.	28.	0.	1.
	100	12.	7.	4.	18.	70.	23.	1.	0.
STOMACH	0	11.	10.	12.	5.	16.	31.	0.	0.
	1	13.	18.	5.	6.	18.	19.	0.	2.
	10	4.	8.	7.	8.	30.	14.	0.	1.
	100	9.	14.	3.	3.	15.	27.	1.	1.
BLOOD	0	2.	10.	9.	5.	15.	20.	0.	1.
	1	10.	6.	10.	2.	16.	17.	0.	0.
	10	3.	6.	9.	7.	20.	19.	0.	0.
	100	9.	11.	9.	8.	21.	24.	0.	0.

Azoxymethane (C-47)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	8.	13.	7.	9.	16.	29.	229.	258.
	1	8.	6.	9.	11.	19.	15.	114.	103.
	10	7.	8.	4.	5.	15.	9.	149.	120.
	100	9.	7.	0.	5.	11.	10.	124.	176.
LIVER	0	7.	9.	10.	8.	20.	23.	232.	221.
	1	[illegible]	11.	11.	3.	22.	20.	168.	168.
	10	8.	5.	5.	11.	21.	13.	197.	149.
	100	10.	9.	11.	7.	18.	17.	184.	134.
KIDNEY	0	17.	8.	17.	13.	23.	21.	244.	201.
	1	11.	18.	9.	20.	22.	15.	124.	146.
	10	16.	9.	16.	13.	23.	20.	177.	151.
	100	14.	8.	19.	14.	23.	19.	163.	117.
BRAIN	0	11.	13.	5.	5.	31.	27.	172.	179.
	1	6.	7.	7.	10.	17.	19.	128.	179.
	10	11.	1.	6.	5.	19.	15.	155.	138.
	100	14.	7.	5.	8.	10.	10.	124.	173.
SPLEEN	0	9.	18.	7.	13.	21.	27.	284.	238.
	1	3.	13.	11.	7.	14.	13.	179.	176.
	10	13.	9.	9.	11.	11.	15.	135.	191.
	100	11.	19.	10.	16.	11.	16.	200.	224.
LUNG	0	13.	6.	7.	13.	27.	30.	200.	285.
	1	19.	11.	2.	13.	8.	15.	139.	107.
	10	10.	17.	6.	8.	13.	9.	190.	147.
	100	10.	14.	5.	7.	15.	7.	192.	172.
STOMACH	0	5.	16.	11.	4.	5.	19.	159.	182.
	1	7.	6.	8.	3.	23.	24.	293.	189.
	10	10.	9.	13.	6.	16.	25.	136.	149.
	100	9.	7.	9.	7.	29.	12.	129.	169.
BLOOD	0	17.	9.	12.	15.	21.	18.	149.	198.
	1	9.	8.	7.	10.	24.	21.	197.	203.
	10	12.	6.	5.	9.	14.	28.	172.	161.
	100	7.	5.	6.	7.	14.	10.	188.	204.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens (Revertant Colonies per Plate; Duplicate Plates)

1,2-Benzanthracene (C-35)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	10.	7.	3.	6.	11.	10.	177.	107.
	1	16.	17.	11.	9.	9.	8.	109.	139.
	10	7.	10.	16.	3.	19.	17.	92.	104.
	100	25.	12.	8.	6.	6.	21.	103.	105.
LIVER	0	21.	22.	10.	6.	14.	13.	176.	160.
	1	16.	8.	11.	9.	195.	192.	138.	195.
	10	13.	12.	8.	14.	195.	135.	200.	160.
	100	18.	10.	17.	13.	9432.	6872.	215.	230.
KIDNEY	0	22.	15.	4.	9.	10.	17.	193.	161.
	1	10.	16.	11.	9.	11.	13.	178.	141.
	10	16.	9.	20.	20.	8.	6.	256.	223.
	100	16.	12.	15.	16.	29.	25.	141.	165.
BRAIN	0	19.	27.	9.	3.	23.	24.	170.	163.
	1	16.	8.	3.	10.	27.	20.	101.	70.
	10	17.	14.	4.	7.	13.	18.	143.	88.
	100	18.	13.	8.	9.	16.	8.	119.	136.
SPLEEN	0	11.	14.	11.	9.	14.	18.	277.	200.
	1	23.	21.	8.	10.	19.	24.	210.	218.
	10	13.	[illegible]	9.	12.	24.	22.	217.	236.
	100	18.	[illegible]	14.	13.	31.	22.	182.	213.
LUNG	0	10.	17.	13.	11.	24.	17.	101.	160.
	1	14.	22.	10.	3.	19.	17.	102.	116.
	10	14.	18.	4.	13.	20.	19.	134.	123.
	100	13.	20.	12.	12.	19.	15.	130.	136.
STOMACH	0	22.	20.	6.	6.	14.	12.	231.	242.
	1	22.	19.	5.	9.	23.	27.	207.	283.
	10	15.	17.	11.	12.	21.	23.	226.	178.
	100	13.	9.	10.	4.	27.	15.	251.	209.
BLOOD	0	14.	10.	7.	9.	17.	17.	206.	177.
	1	12.	12.	9.	12.	11.	9.	208.	254.
	10	12.	5.	12.	5.	14.	10.	266.	270.
	100	6.	19.	5.	5.	14.	10.	304.	260.

Benzidine (C-1)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	2.	3.	11.	11.	8.	13.	0.	0.
	1	7.	10.	9.	13.	9.	5.	0.	0.
	10	6.	3.	9.	17.	17.	17.	0.	0.
	100	7.	8.	14.	17.	17.	19.	0.	1.
LIVER	0	11.	10.	14.	14.	15.	18.	0.	0.
	1	7.	9.	13.	13.	40.	35.	5.	2.
	10	15.	11.	12.	7.	118.	87.	3.	6.
	100	16.	12.	16.	16.	270.	279.	5.	4.
KIDNEY	0	14.	22.	23.	13.	19.	10.	0.	0.
	1	17.	11.	20.	11.	19.	24.	2.	0.
	10	10.	15.	26.	19.	36.	71.	4.	1.
	100	16.	14.	19.	21.	32.	91.	4.	0.
BRAIN	0	17.	17.	15.	11.	19.	21.	0.	0.
	1	15.	11.	10.	12.	28.	13.	1.	2.
	10	8.	14.	11.	15.	22.	11.	0.	1.
	100	8.	17.	15.	9.	19.	14.	2.	0.
SPLEEN	0	7.	19.	18.	19.	19.	20.	1.	1.
	1	5.	5.	12.	14.	8.	14.	0.	0.
	10	7.	3.	16.	12.	26.	20.	0.	0.
	100	5.	8.	16.	15.	25.	22.	0.	2.
LUNG	0	14.	10.	18.	15.	31.	19.	0.	1.
	1	6	8.	12.	8.	22.	29.	2.	1.
	10	9.	11.	16.	15.	42.	32.	0.	3.
	100	5.	6.	18.	16.	57.	33.	0.	1.
STOMACH	0	8.	9.	18.	16.	17.	20.	1.	0.
	1	9.	15.	11.	9.	22.	17.	0.	0.
	10	8.	16.	9.	10.	16.	13.	0.	1.
	100	9.	18.	13.	17.	11.	10.	0.	1.
BLOOD	0	2.	3.	19.	9.	10.	23.	0.	0.
	1	2.	5.	8.	10.	17.	10.	0.	0.
	10	2.	14.	16.	18.	8.	18.	0.	0.
	100	7.	5.	18.	18.	16.	16.	0.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

1,12-Benzoperylene (C-38)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	5.	8.	6.	13.	27.	176.	197.
	1	6.	4.	5.	3.	31.	16.	183.	199.
	10	8.	2.	5.	4.	15.	13.	203.	211.
	100	6.	6.	6.	5.	19.	12.	191.	179.
LIVER	0	10.	7.	7.	7.	22.	22.	232.	189.
	1	9.	9.	12.	6.	23.	15.	251.	247.
	10	12.	6.	11.	5.	36.	26.	279.	197.
	100	6.	7.	5.	10.	144.	124.	217.	187.
KIDNEY	0	13.	14.	17.	8.	35.	25.	230.	247.
	1	21.	17.	23.	16.	36.	31.	347.	[illegible]
	10	17.	23.	25.	17.	58.	52.	308.	340.
	100	11.	13.	15.	13.	37.	27.	269.	341.
BRAIN	0	13.	10.	6.	6.	26.	19.	215.	201.
	1	13.	11.	8.	10.	22.	25.	195.	254.
	10	12.	7.	6.	10.	29.	20.	249.	205.
	100	10.	8.	7.	6.	24.	23.	226.	208.
SPLEEN	0	13.	17.	15.	10.	21.	21.	455.	304.
	1	6.	8.	7.	7.	35.	16.	205.	283.
	10	15.	16.	9.	11.	19.	32.	251.	256.
	100	12.	16.	9.	17.	29.	48.	254.	269.
LUNG	0	18.	11.	8.	10.	35.	18.	245.	216.
	1	15.	8.	8.	9.	22.	30.	172.	193.
	10	19.	16.	10.	10.	39.	27.	344.	316.
	100	9.	11.	6.	6.	27.	19.	296.	194.
STOMACH	0	17.	12.	4.	5.	22.	23.	197.	188.
	1	9.	11.	4.	7.	24.	33.	241.	216.
	10	7.	23.	6.	4.	18.	24.	233.	219.
	100	19.	16.	8.	9.	29.	24.	231.	234.
BLOOD	0	6.	10.	3.	10.	16.	18.	245.	266.
	1	7.	9.	6.	5.	18.	21.	221.	219.
	10	5.	5.	4.	3.	21.	13.	229.	223.
	100	4.	6.	3.	6.	13.	13.	213.	215.

Benzo(a)pyrene (C-25)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	3.	5.	5.	4.	7.	8.	0.	0.
	1	2.	8.	3.	6.	9.	13.	1.	0.
	10	4.	7.	2.	6.	3.	13.	0.	0.
	100	0.	6.	7.	3.	4.	9.	0.	0.
LIVER	0	30.	25.	7.	6.	10.	16.	0.	1.
	1	32.	18.	5.	13.	16.	13.	1.	0.
	10	28.	30.	13.	29.	137.	105.	4.	0.
	100	20.	29.	31.	24.	29.	30.	3.	3.
KIDNEY	0	31.	27.	3.	10.	17.	20.	0.	0.
	1	20.	23.	12.	13.	26.	17.	0.	1.
	10	34.	14.	13.	11.	25.	17.	2.	1.
	100	22.	27.	4.	13.	16.	13.	1.	0.
BRAIN	0	25.	23.	2.	6.	15.	9.	0.	3.
	1	7.	5.	5.	5.	11.	14.	0.	0.
	10	28.	33.	5.	1.	22.	15.	0.	0.
	100	6.	9.	6.	4.	20.	10.	1.	1.
SPLEEN	0	17.	27.	4.	8.	17.	11.	0.	1.
	1	22.	9.	14.	16.	14.	11.	0.	1.
	10	5.	12.	11.	11.	18.	14.	2.	1.
	100	7.	11.	4.	12.	21.	22.	0.	0.
LUNG	0	17.	22.	6.	6.	16.	15.	2.	1.
	1	22.	24.	5.	11.	12.	12.	1.	0.
	10	18.	19.	9.	5.	12.	18.	2.	0.
	100	27.	12.	9.	8.	20.	17.	1.	1.
STOMACH	0	15.	17.	4.	8.	15.	22.	2.	0.
	1	11.	17.	12.	12.	15.	18.	2.	3.
	10	9.	28.	11.	9.	27.	19.	0.	1.
	100	15.	17.	4.	5.	12.	17.	0.	1.
BLOOD	0	11.	14.	7.	9.	9.	17.	1.	1.
	1	21.	19.	12.	9.	17.	15.	1.	1.
	10	14.	19.	20.	6.	21.	20.	9.	0.
	100	18.	14.	18.	11.	28.	17.	0.	2.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens (Revertant Colonies per Plate; Duplicate Plates)

Captan (C-32)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	3.	10.	7.	4.	7.	7.	0.	0.
	1	9.	17.	5.	3.	5.	5.	0.	0.
	10	94.	104.	16.	22.	8.	12.	0.	0.
	100	6.	8.	0.	0.	0.	20.	0.	0.
LIVER	0	9.	7.	11.	10.	14.	9.	0.	0.
	1	10.	10.	3.	13.	9.	12.	0.	0.
	10	20.	10.	9.	6.	21.	15.	0.	0.
	100	287.	369.	65.	52.	27.	22.	1.	1.
KIDNEY	0	14.	10.	3.	11.	10.	10.	0.	0.
	1	18.	9.	7.	12.	20.	16.	0.	0.
	10	177.	170.	42.	81.	33.	21.	2.	0.
	100	168.	233.	3.	2.	6.	8.	0.	0.
BRAIN	0	11.	4.	9.	5.	16.	7.	0.	0.
	1	14.	19.	6.	7.	8.	5.	0.	0.
	10	126.	175.	25.	32.	12.	14.	0.	0.
	100	6.	3.	0.	0.	7.	4.	0.	0.
SPLEEN	0	9.	13.	4.	9.	10.	15.	1.	0.
	1	7.	4.	4.	7.	19.	16.	0.	0.
	10	113.	142.	3.	1.	2.	14.	0.	0.
	100	76.	98.	50.	38.	22.	9.	0.	0.
LUNG	0	18.	11.	5.	7.	10.	14.	0.	0.
	1	24.	12.	8.	6.	10.	7.	0.	0.
	10	84.	87.	22.	21.	14.	13.	0.	0.
	100	398.	168.	32.	9.	19.	12.	0.	0.
STOMACH	0	6.	7.	3.	7.	13.	13.	0.	0.
	1	7.	10.	2.	11.	7.	13.	0.	2.
	10	108.	144.	37.	88.	20.	22.	0.	0.
	100	53.	69.	16.	40.	14.	14.	0.	0.
BLOOD	0	10.	12.	6.	3.	7.	5.	0.	0.
	1	7.	4.	4.	6.	8.	7.	0.	0.
	10	8.	10.	4.	3.	10.	9.	0.	0.
	100	19.	18.	13.	9.	13.	10.	0.	0.

Dibenz(a,j)acridine (C-49)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	10.	3.	5.	3.	13.	12.	190.	154.
	1	5.	11.	7.	1.	15.	18.	133.	225.
	10	8.	3.	4.	1.	18.	12.	150.	201.
	100	9.	4.	5.	9.	14.	14.	184.	209.
LIVER	0	9.	6.	8.	6.	19.	11.	170.	180.
	1	5.	3.	7.	1.	28.	10.	152.	224.
	10	11.	9.	17.	18.	49.	53.	295.	150.
	100	6.	6.	50.	58.	91.	116.	269.	190.
KIDNEY	0	13.	14.	10.	6.	45.	36.	164.	159.
	1	11.	8.	14.	7.	30.	47.	194.	214.
	10	11.	6.	10.	8.	22.	31.	191.	136.
	100	9.	14.	4.	6.	27.	25.	147.	204.
BRAIN	0	11.	12.	13.	2.	31.	24.	245.	188.
	1	3.	11.	3.	7.	27.	19.	294.	175.
	10	3.	4.	6.	9.	20.	18.	311.	179.
	100	11.	18.	7.	8.	10.	44.	284.	267.
SPLEEN	0	15.	8.	5.	8.	17.	13.	129.	113.
	1	12.	13.	6.	10.	20.	21.	175.	146.
	10	23.	9.	11.	11.	32.	23.	199.	127.
	100	16.	9.	7.	19.	34.	22.	131.	102.
LUNG	0	12.	8.	4.	5.	27.	23.	173.	157.
	1	8.	5.	3.	11.	23.	21.	113.	119.
	10	15.	10.	4.	8.	31.	19.	130.	133.
	100	18.	5.	4.	8.	16.	25.	145.	151.
STOMACH	0	10.	13.	1.	3.	12.	18.	152.	134.
	1	9.	5.	5.	1.	15.	17.	120.	94.
	10	10.	5.	3.	4.	24.	26.	107.	125.
	100	36.	10.	8.	7.	7.	21.	118.	127.
BLOOD	0	5.	10.	7.	7.	38.	31.	154.	150.
	1	6.	6.	4.	4.	13.	20.	189.	174.
	10	7.	5.	10.	9.	30.	18.	165.	187.
	100	4.	2.	10.	7.	18.	20.	175.	164.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

1,2,5,6-Dibenzanthracene (C-29)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	7.	7.	3.	9.	11.	11.	1.	0.
	1	11.	6.	5.	3.	10.	14.	0.	0.
	10	12.	12.	4.	3.	15.	7.	0.	0.
	100	9.	3.	7.	3.	19.	8.	0.	0.
LIVER	0	7.	4.	4.	7.	20.	25.	1.	0.
	1	10.	5.	10.	6.	22.	30.	0.	0.
	10	5.	6.	19.	13.	25.	33.	3.	0.
	100	8.	9.	17.	11.	19.	25.	0.	0.
KIDNEY	0	18.	14.	13.	9.	22.	37.	0.	0.
	1	8.	10.	15.	11.	24.	24.	5.	0.
	10	23.	13.	16.	16.	40.	15.	5.	2.
	100	10.	12.	29.	17.	41.	37.	3.	4.
BRAIN	0	10.	9.	5.	9.	11.	22.	0.	0.
	1	13.	19.	7.	7.	15.	19.	0.	0.
	10	20.	23.	7.	11.	6.	20.	0.	0.
	100	14.	9.	9.	11.	19.	22.	2.	0.
SPLEEN	0	16.	13.	18.	2.	19.	24.	0.	0.
	1	20.	9.	15.	3.	23.	21.	3.	0.
	10	14.	13.	7.	12.	22.	16.	2.	0.
	100	12.	8.	8.	11.	21.	25.	0.	3.
LUNG	0	8.	9.	3.	7.	20.	13.	0.	0.
	1	20.	14.	9.	4.	25.	20.	1.	0.
	10	19.	15.	10.	10.	18.	25.	1.	0.
	100	18.	17.	10.	13.	21.	16.	1.	2.
STOMACH	0	10.	20.	8.	4.	27.	14.	1.	1.
	1	20.	14.	10.	12.	18.	28.	4.	1.
	10	19.	15.	13.	15.	15.	21.	2.	0.
	100	16.	10.	9.	17.	31.	18.	7.	4.
BLOOD	0	9.	9.	2.	7.	20.	15.	1.	1.
	1	8.	8.	2.	3.	19.	18.	0.	2.
	10	3.	7.	9.	4.	17.	16.	0.	0.
	100	6.	5.	9.	6.	12.	9.	1.	1.

7H-Dibenzo(c,g)carbazole (C-37)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	6.	6.	2.	12.	12.	19.	209.	216.
	1	8.	10.	7.	4.	19.	20.	276.	252.
	10	11.	9.	24.	48.	15.	19.	138.	108.
	100	3.	1.	10.	10.	13.	1.	367.	470.
LIVER	0	13.	4.	5.	6.	33.	29.	168.	178.
	1	11.	7.	4.	4.	36.	30.	316.	297.
	10	6.	8.	12.	4.	52.	48.	368.	334.
	100	8.	5.	8.	6.	55.	56.	277.	291.
KIDNEY	0	11.	21.	13.	12.	36.	39.	162.	209.
	1	20.	8.	14.	4.	548.	508.	264.	275.
	10	8.	13.	17.	16.	491.	427.	325.	352.
	100	18.	8.	15.	14.	54.	32.	1158.	579.
BRAIN	0	10.	7.	7.	11.	64.	39.	163.	146.
	1	11.	11.	8.	5.	405.	235.	234.	284.
	10	5.	7.	3.	4.	303.	232.	195.	217.
	100	1.	3.	4.	1.	9.	6.	823.	806.
SPLEEN	0	9.	12.	7.	21.	40.	33.	253.	242.
	1	13.	9.	13.	5.	33.	19.	308.	376.
	10	10.	4.	6.	9.	35.	20.	249.	278.
	100	7.	8.	2.	1.	27.	33.	910.	670.
LUNG	0	7.	11.	1.	0.	28.	12.	209.	204.
	1	12.	38.	8.	12.	188.	146.	332.	272.
	10	14.	7.	6.	6.	161.	150.	336.	234.
	100	13.	8.	2.	3.	130.	128.	840.	966.
STOMACH	0	11.	9.	2.	11.	36.	29.	237.	177.
	1	13.	20.	5.	8.	36.	28.	300.	294.
	10	7.	11.	6.	7.	27.	29.	230.	218.
	100	13.	14.	4.	1.	10.	10.	1296.	1188.
BLOOD	0	9.	9.	7.	15.	25.	21.	240.	198.
	1	14.	7.	4.	8.	15.	19.	266.	313.
	10	5.	6.	7.	4.	32.	8.	297.	225.
	100	3.	4.	5.	7.	23.	11.	265.	190.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Dibenzo(a,i)pyrene (C-46)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	7.	2.	4.	20.	14.	230.	214.
	1	10.	8.	4.	7.	24.	8.	202.	168.
	10	6.	13.	6.	5.	9.	17.	184.	162.
	100	5.	5.	8.	6.	15.	13.	170.	163.
LIVER	0	9.	12.	9.	4.	31.	27.	272.	236.
	1	12.	7.	12.	5.	27.	22.	238.	216.
	10	10.	7.	7.	9.	40.	63.	218.	310.
	100	12.	6.	8.	14.	86.	116.	258.	288.
KIDNEY	0	20.	15.	7.	11.	27.	35.	228.	218.
	1	13.	16.	23.	12.	43.	29.	204.	193.
	10	15.	18.	11.	20.	33.	47.	196.	213.
	100	6.	17.	20.	18.	46.	43.	456.	224.
BRAIN	0	9.	14.	7.	11.	34.	23.	177.	142.
	1	13.	8.	12.	8.	25.	30.	290.	291.
	10	15.	11.	7.	7.	22.	16.	254.	219.
	100	8.	10.	11.	6.	17.	27.	107.	203.
SPLEEN	0	9.	13.	10.	6.	24.	16.	304.	164.
	1	16.	7.	8.	6.	10.	11.	213.	252.
	10	8.	11.	10.	5.	18.	18.	192.	216.
	100	16.	6.	8.	8.	16.	23.	184.	176.
LUNG	0	6.	6.	8.	10.	26.	25.	234.	218.
	1	17.	10.	11.	12.	24.	22.	148.	204.
	10	13.	9.	11.	13.	24.	23.	160.	198.
	100	17.	9.	14.	4.	29.	16.	208.	190.
STOMACH	0	6.	10.	0.	3.	13.	10.	205.	202.
	1	9.	11.	5.	8.	22.	19.	194.	194.
	10	11.	12.	8.	12.	15.	21.	230.	246.
	100	17.	13.	7.	11.	12.	17.	162.	147.
BLOOD	0	2.	10.	7.	8.	22.	18.	205.	199.
	1	5.	3.	6.	13.	20.	40.	259.	257.
	10	9.	5.	7.	13.	20.	24.	220.	260.
	100	6.	5.	12.	8.	20.	18.	185.	222.

3,3'-Dichlorobenzidine (C-4)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	3.	5.	4.	5.	7.	8.	0.	0.
	1	4.	1.	1.	0.	11.	13.	0.	0.
	10	2.	3.	3.	4.	30.	40.	0.	0.
	100	3.	3.	7.	3.	119.	116.	0.	0.
LIVER	0	30.	25.	7.	6.	10.	16.	0.	1.
	1	37.	50.	7.	4.	100.	101.	1.	0.
	10	57.	49.	13.	11.	3410.	2915.	1.	0.
	100	40.	34.	51.	47.	7843.	9295.	1.	1.
KIDNEY	0	31.	27.	3.	10.	17.	20.	0.	0.
	1	33.	38.	18.	15.	27.	29.	0.	0.
	10	24.	14.	10.	10.	104.	87.	0.	1.
	100	39.	38.	5.	9.	361.	362.	4.	0.
BRAIN	0	25.	23.	2.	0.	15.	9.	0.	3.
	1	14.	21.	4.	7.	17.	8.	2.	2.
	10	37.	25.	8.	4.	36.	27.	0.	0.
	100	11.	11.	2.	6.	148.	141.	1.	1.
SPLEEN	0	16.	17.	21.	11.	57.	63.	0.	0.
	1	18.	14.	17.	33.	50.	28.	1.	1.
	10	19.	34.	20.	36.	93.	112.	2.	2.
	100	52.	27.	13.	18.	291.	334.	0.	2.
LUNG	0	17.	22.	8.	6.	16.	15.	2.	1.
	1	11.	14.	6.	4.	433.	305.	0.	0.
	10	13.	20.	25.	16.	4015.	4435.	0.	1.
	100	16.	19.	42.	44.	8635.	9515.	0.	0.
STOMACH	0	15.	15.	9.	10.	29.	36.	2.	0.
	1	10.	6.	12.	14.	75.	36.	0.	0.
	10	10.	10.	1.	9.	119.	115.	2.	0.
	100	12.	35.	7.	20.	390.	321.	0.	1.
BLOOD	0	11.	11.	13.	11.	36.	42.	0.	0.
	1	9.	2.	7.	3.	79.	45.	2.	2.
	10	8.	7.	10.	11.	56.	39.	1.	2.
	100	7.	8.	8.	6.	215.	170.	1.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

3,3'-Dimethoxybenzidine (C-15)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	7.	10.	8.	8.	13.	13.	1.	2.
	1	11.	8.	14.	12.	25.	18.	1.	1.
	10	12.	15.	14.	17.	38.	20.	1.	0.
	100	12.	20.	16.	9.	21.	26.	3.	1.
LIVER	0	22.	19.	26.	32.	18.	27.	1.	4.
	1	22.	26.	34.	35.	49.	68.	9.	1.
	10	17.	23.	32.	24.	103.	110.	4.	4.
	100	29.	16.	13.	10.	160.	169.	9.	2.
KIDNEY	0	6.	7.	13.	17.	53.	30.	2.	1.
	1	10.	6.	21.	16.	37.	26.	0.	1.
	10	13.	8.	19.	16.	37.	33.	0.	1.
	100	5.	0.	13.	18.	40.	41.	1.	0.
BRAIN	0	5.	5.	8.	7.	17.	17.	0.	0.
	1	9.	0.	2.	8.	24.	19.	0.	1.
	10	3.	5.	6.	17.	15.	14.	1.	1.
	100	7.	7.	9.	5.	15.	28.	0.	0.
SPLEEN	0	17.	25.	8.	10.	16.	24.	1.	0.
	1	24.	29.	0.	5.	11.	20.	0.	0.
	10	31.	34.	5.	10.	26.	23.	0.	0.
	100	27.	19.	7.	6.	12.	34.	0.	0.
LUNG	0	2.	8.	13.	19.	27.	29.	2.	1.
	1	6.	5.	16.	17.	28.	38.	0.	1.
	10	6.	4.	18.	16.	42.	36.	1.	0.
	100	13.	8.	20.	12.	106.	66.	1.	2.
STOMACH	0	10.	9.	11.	13.	29.	20.	0.	0.
	1	5.	1.	8.	7.	17.	20.	1.	0.
	10	8.	3.	7.	11.	20.	17.	0.	0.
	100	6.	3.	6.	6.	27.	33.	0.	0.
BLOOD	0	27.	50.	2.	7.	26.	15.	1.	1.
	1	37.	30.	3.	7.	21.	10.	0.	0.
	10	17.	26.	5.	4.	13.	10.	1.	1.
	100	27.	30.	4.	7.	10.	13.	2.	0.

N,N-Dimethylaminoazobenzene (C-14)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	2.	0.	13.	7.	10.	2.	0.	0.
	1	0.	0.	9.	13.	3.	5.	0.	0.
	10	2.	1.	11.	5.	12.	0.	0.	0.
	100	0.	0.	8.	9.	17.	4.	0.	0.
LIVER	0	11.	9.	10.	10.	21.	20.	1.	1.
	1	6.	14.	10.	13.	24.	24.	3.	3.
	10	9.	10.	18.	12.	20.	27.	4.	0.
	100	5.	10.	13.	17.	30.	19.	0.	0.
KIDNEY	0	9.	15.	21.	12.	14.	16.	0.	0.
	1	10.	11.	17.	23.	28.	29.	1.	3.
	10	19.	11.	20.	19.	30.	36.	0.	0.
	100	12.	8.	18.	20.	31.	28.	0.	0.
BRAIN	0	5.	9.	12.	11.	19.	7.	0.	0.
	1	2.	8.	15.	10.	16.	11.	0.	0.
	10	4.	5.	11.	10.	22.	15.	0.	0.
	100	0.	5.	8.	12.	14.	14.	0.	0.
SPLEEN	0	12.	11.	14.	13.	10.	8.	0.	0.
	1	5.	9.	16.	9.	18.	13.	0.	0.
	10	6.	13.	9.	9.	16.	15.	0.	0.
	100	8.	10.	14.	16.	16.	19.	0.	0.
LUNG	0	30.	8.	15.	8.	15.	20.	0.	0.
	1	11.	8.	11.	15.	20.	10.	0.	0.
	10	8.	16.	10.	4.	18.	24.	0.	0.
	100	7.	5.	16.	7.	17.	18.	0.	0.
STOMACH	0	4.	2.	9.	16.	22.	20.	0.	0.
	1	11.	11.	13.	9.	10.	16.	0.	0.
	10	4.	7.	9.	11.	16.	24.	0.	0.
	100	3.	6.	10.	13.	11.	13.	0.	0.
BLOOD	0	6.	8.	7.	19.	13.	12.	1.	1.
	1	1.	4.	1.	0.	10.	10.	1.	3.
	10	18.	11.	3.	7.	29.	9.	1.	0.
	100	9.	11.	1.	4.	9.	15.	0.	2.

APPENDIX B-2 (Continued)

Results of *Salmonella* Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

4-Dimethylaminostilbene (C-39)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	7.	12.	5.	2.	15.	10.	120.	149.
	1	8.	7.	6.	2.	12.	9.	132.	150.
	10	10.	17.	4.	2.	16.	20.	182.	205.
	100	6.	10.	3.	4.	6.	20.	173.	227.
LIVER	0	11.	17.	4.	6.	23.	24.	182.	250.
	1	11.	12.	5.	11.	20.	23.	276.	242.
	10	8.	18.	8.	4.	59.	77.	654.	477.
	100	10.	10.	10.	11.	110.	98.	711.	546.
KIDNEY	0	8.	5.	8.	7.	27.	33.	344.	314.
	1	9.	12.	11.	13.	49.	37.	201.	278.
	10	9.	17.	12.	10.	30.	38.	334.	309.
	100	12.	8.	9.	9.	39.	37.	250.	269.
BRAIN	0	9.	12.	4.	5.	25.	19.	215.	189.
	1	4.	9.	6.	8.	19.	29.	252.	217.
	10	7.	12.	5.	11.	39.	29.	191.	140.
	100	10.	12.	4.	11.	21.	24.	207.	216.
SPLEEN	0	5.	10.	3.	3.	18.	21.	234.	225.
	1	9.	9.	5.	2.	32.	24.	244.	237.
	10	10.	11.	11.	9.	26.	23.	418.	198.
	100	6.	4.	11.	11.	14.	37.	226.	258.
LUNG	0	22.	8.	5.	3.	20.	23.	231.	222.
	1	17.	7.	4.	6.	27.	22.	212.	148.
	10	5.	8.	8.	10.	26.	20.	178.	223.
	100	8.	11.	6.	13.	19.	28.	207.	208.
STOMACH	0	8.	6.	15.	2.	36.	27.	188.	233.
	1	8.	11.	4.	3.	24.	23.	249.	213.
	10	15.	6.	1.	3.	30.	28.	220.	199.
	100	9.	9.	2.	11.	31.	17.	273.	194.
BLOOD	0	6.	4.	5.	7.	19.	22.	184.	215.
	1	7.	5.	8.	6.	41.	25.	211.	261.
	10	7.	4.	15.	8.	31.	23.	165.	235.
	100	13.	2.	7.	10.	21.	27.	189.	165.

7,9-Dimethyl Benz(c)acridine (C-36)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	2.	6.	7.	11.	23.	17.	202.	129.
	1	10.	4.	3.	10.	18.	19.	145.	194.
	10	10.	6.	6.	3.	16.	16.	58.	151.
	100	4.	5.	2.	7.	13.	18.	189.	168.
LIVER	0	6.	9.	9.	7.	29.	24.	142.	198.
	1	10.	9.	12.	11.	20.	29.	347.	247.
	10	7.	6.	13.	9.	28.	33.	313.	274.
	100	10.	5.	49.	47.	99.	101.	488.	548.
KIDNEY	0	8.	7.	8.	13.	32.	29.	255.	292.
	1	11.	14.	15.	8.	30.	44.	284.	262.
	10	10.	14.	6.	6.	28.	32.	263.	226.
	100	15.	7.	10.	11.	23.	42.	240.	242.
BRAIN	0	10.	2.	5.	1.	23.	22.	196.	224.
	1	6.	14.	13.	5.	33.	20.	175.	182.
	10	6.	3.	12.	7.	37.	13.	227.	220.
	100	7.	5.	6.	9.	24.	20.	207.	189.
SPLEEN	0	6.	8.	4.	4.	17.	30.	201.	173.
	1	17.	14.	5.	6.	32.	25.	280.	187.
	10	12.	12.	6.	4.	41.	35.	221.	202.
	100	9.	4.	3.	3.	25.	26.	255.	182.
LUNG	0	9.	7.	3.	4.	19.	21.	183.	205.
	1	8.	4.	5.	7.	13.	16.	239.	179.
	10	16.	12.	8.	6.	30.	43.	199.	241.
	100	16.	9.	5.	10.	63.	50.	160.	192.
STOMACH	0	11.	2.	3.	4.	26.	32.	169.	127.
	1	8.	6.	1.	6.	33.	18.	237.	193.
	10	12.	11.	4.	3.	37.	30.	218.	224.
	100	17.	6.	5.	7.	28.	16.	288.	203.
BLOOD	0	14.	16.	7.	4.	17.	15.	259.	240.
	1	9.	10.	8.	5.	20.	27.	254.	241.
	10	11.	10.	7.	8.	23.	28.	280.	195.
	100	7.	17.	5.	5.	22.	29.	273.	214.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens (Revertant Colonies per Plate; Duplicate Plates)

9,10-Dimethyl-1,2-benzanthracene (C-6)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	23.	34.	7.	8.	18.	16.	1.	0.
	1	4.	5.	8.	10.	22.	13.	0.	0.
	10	3.	11.	9.	8.	17.	17.	0.	1.
	100	5.	9.	69.	42.	54.	25.	0.	0.
LIVER	0	19.	11.	10.	15.	36.	20.	1.	0.
	1	5.	37.	10.	6.	23.	18.	9.	1.
	10	13.	15.	17.	6.	22.	32.	1.	1.
	100	18.	8.	45.	25.	30.	30.	1.	1.
KIDNEY	0	12.	11.	16.	12.	28.	30.	0.	1.
	1	12.	11.	20.	13.	28.	29.	3.	2.
	10	19.	18.	12.	17.	28.	29.	2.	1.
	100	13.	17.	92.	79.	104.	44.	1.	0.
BRAIN	0	31.	37.	5.	9.	19.	17.	0.	0.
	1	12.	22.	6.	8.	19.	28.	0.	0.
	10	27.	19.	6.	14.	15.	29.	1.	1.
	100	33.	28.	75.	69.	180.	208.	0.	1.
SPLEEN	0	16.	24.	10.	16.	23.	27.	0.	0.
	1	19.	20.	11.	9.	39.	14.	3.	1.
	10	32.	17.	4.	10.	26.	35.	1.	1.
	100	17.	17.	76.	79.	200.	70.	1.	2.
LUNG	0	22.	29.	5.	5.	13.	19.	0.	0.
	1	4.	14.	7.	7.	22.	26.	0.	2.
	10	12.	8.	11.	10.	15.	25.	0.	1.
	100	21.	10.	37.	41.	55.	73.	1.	1.
STOMACH	0	33.	31.	9.	9.	35.	21.	0.	0.
	1	33.	32.	3.	4.	14.	25.	0.	1.
	10	13.	9.	6.	5.	21.	29.	0.	1.
	100	48.	10.	68.	62.	143.	81.	0.	1.
BLOOD	0	11.	11.	3.	10.	23.	21.	1.	1.
	1	4.	4.	10.	9.	16.	19.	0.	2.
	10	42.	44.	8.	9.	16.	20.	1.	1.
	100	5.	9.	9.	8.	9.	20.	0.	0.

4,4'-Dinitrobiphenyl (C-53)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	9.	3.	7.	5.	23.	12.	28.	18.
	1	8.	3.	19.	7.	47.	53.	23.	26.
	10	8.	3.	103.	70.	200.	197.	30.	37.
	100	7.	8.	215.	108.	441.	397.	61.	39.
LIVER	0	8.	2.	6.	3.	18.	19.	41.	31.
	1	3.	5.	11.	13.	119.	95.	36.	36.
	10	8.	4.	104.	132.	334.	365.	48.	95.
	100	7.	3.	184.	260.	722.	678.	57.	63.
KIDNEY	0	6.	4.	5.	8.	12.	16.	30.	37.
	1	3.	8.	26.	28.	71.	43.	34.	43.
	10	5.	12.	162.	160.	538.	363.	66.	65.
	100	3.	5.	221.	213.	440.	332.	96.	81.
BRAIN	0	7.	6.	4.	4.	8.	18.	43.	53.
	1	7.	12.	12.	14.	46.	42.	32.	31.
	10	4.	8.	90.	133.	207.	481.	44.	63.
	100	8.	8.	165.	230.	207.	471.	56.	108.
SPLEEN	0	3.	4.	3.	5.	19.	20.	31.	33.
	1	9.	4.	4.	8.	21.	49.	23.	39.
	10	9.	8.	39.	61.	130.	162.	49.	58.
	100	6.	9.	69.	74.	291.	242.	45.	83.
LUNG	0	7.	6.	3.	8.	13.	21.	30.	31.
	1	11.	13.	11.	16.	34.	68.	31.	47.
	10	3.	7.	79.	128.	191.	334.	35.	54.
	100	6.	4.	73.	128.	138.	309.	44.	66.
STOMACH	0	7.	8.	2.	1.	11.	19.	27.	33.
	1	3.	10.	9.	7.	57.	64.	38.	44.
	10	4.	7.	43.	72.	190.	122.	30.	93.
	100	12.	3.	125.	123.	264.	354.	63.	78.
BLOOD	0	3.	3.	2.	3.	10.	19.	30.	25.
	1	8.	5.	12.	7.	16.	19.	50.	31.
	10	5.	9.	15.	6.	33.	39.	38.	32.
	100	6.	10.	13.	21.	45.	54.	33.	39.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens (Revertant Colonies per Plate; Duplicate Plates)

Ethylenimine (C-52)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	3.	7.	6.	1.	13.	12.	47.	53.
	1	130.	63.	4.	6.	11.	16.	727.	147.
	10	861.	882.	3.	5.	18.	17.	928.	1109.
	100	3304.	3012.	6.	9.	17.	21.	4640.	3710.
LIVER									
	0	4.	4.	2.	1.	14.	10.	62.	51.
	1	113.	83.	5.	9.	14.	14.	144.	180.
	10	1176.	1453.	3.	9.	22.	14.	1470.	1032.
	100	4036.	4374.	8.	6.	29.	21.	4250.	4462.
KIDNEY									
	0	8.	6.	6.	3.	13.	16.	38.	42.
	1	149.	199.	11.	22.	34.	26.	120.	334.
	10	1692.	1218.	11.	13.	29.	24.	882.	1106.
	100	3700.	4088.	10.	19.	23.	33.	5386.	5706.
BRAIN									
	0	1.	6.	4.	5.	21.	10.	32.	34.
	1	144.	74.	5.	3.	22.	16.	134.	100.
	10	1393.	1483.	10.	3.	16.	24.	2033.	1403.
	100	5060.	6710.	7.	7.	11.	22.	3903.	4293.
SPLEEN									
	0	3.	9.	3.	1.	13.	17.	127.	143.
	1	98.	83.	3.	6.	11.	11.	316.	282.
	10	1282.	1390.	7.	9.	16.	12.	1923.	1440.
	100	4334.	4938.	8.	3.	10.	13.	3968.	3403.
LUNG									
	0	7.	7.	4.	7.	10.	19.	49.	44.
	1	132.	116.	5.	7.	16.	14.	139.	204.
	10	1908.	1813.	8.	7.	19.	23.	872.	1334.
	100	3348.	3243.	5.	8.	19.	24.	3373.	3413.
STOMACH									
	0	8.	10.	3.	4.	20.	18.	50.	39.
	1	123.	174.	6.	12.	9.	12.	149.	207.
	10	1316.	1240.	6.	2.	23.	12.	896.	882.
	100	4203.	3636.	7.	13.	13.	41.	2884.	3314.
BLOOD									
	0	8.	13.	2.	3.	13.	10.	36.	34.
	1	83.	133.	6.	8.	17.	18.	102.	174.
	10	938.	1428.	8.	4.	16.	27.	1382.	1703.
	100	4384.	4935.	4.	4.	22.	23.	5003.	5333.

Ethyl-ethylnitroso Carbamate (C-42)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	10.	8.	11.	6.	11.	10.	312.	282.
	1	16.	26.	17.	15.	40.	56.	392.	700.
	10	370.	336.	20.	7.	20.	18.	994.	770.
	100	4707.	5275.	19.	27.	26.	14.	3465.	3393.
LIVER									
	0	10.	17.	18.	8.	35.	27.	305.	478.
	1	8.	7.	12.	11.	22.	19.	188.	162.
	10	23.	11.	12.	14.	18.	9.	214.	197.
	100	898.	644.	93.	49.	488.	658.	938.	798.
KIDNEY									
	0	13.	18.	14.	21.	34.	58.	432.	326.
	1	22.	31.	16.	17.	62.	45.	284.	368.
	10	267.	212.	36.	41.	91.	59.	826.	1092.
	100	3135.	2693.	67.	63.	43.	89.	2255.	2145.
BRAIN									
	0	14.	37.	7.	8.	44.	30.	325.	289.
	1	30.	74.	14.	17.	27.	36.	574.	486.
	10	222.	260.	9.	15.	33.	19.	812.	756.
	100	2772.	5992.	27.	38.	43.	32.	7280.	3248.
SPLEEN									
	0	8.	15.	12.	11.	27.	31.	294.	419.
	1	13.	25.	9.	16.	21.	34.	329.	283.
	10	230.	172.	24.	18.	60.	23.	894.	812.
	100	3216.	3780.	37.	38.	16.	31.	3061.	3108.
LUNG									
	0	17.	14.	3.	8.	18.	20.	294.	397.
	1	13.	19.	10.	13.	56.	67.	260.	284.
	10	124.	144.	29.	33.	57.	49.	952.	1022.
	100	4100.	3705.	47.	46.	40.	38.	2530.	2730.
STOMACH									
	0	13.	11.	18.	6.	38.	26.	358.	332.
	1	19.	35.	23.	17.	65.	71.	910.	390.
	10	248.	237.	32.	26.	54.	43.	802.	686.
	100	2174.	3192.	26.	31.	90.	20.	2612.	2072.
BLOOD									
	0	16.	13.	16.	11.	24.	29.	270.	504.
	1	14.	10.	12.	8.	38.	28.	316.	448.
	10	56.	58.	14.	23.	86.	47.	686.	610.
	100	2040.	2145.	67.	42.	107.	73.	2040.	2310.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

N-Hydroxyacetamidofluorene (C-54)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	5.	7.	4.	1.	13.	12.	47.	30.
	1	1.	4.	1.	5.	17.	22.	31.	36.
	10	13.	4.	5.	3.	136.	92.	43.	47.
	100	6.	2.	8.	7.	491.	464.	56.	73.
LIVER									
	0	4.	4.	2.	1.	14.	10.	62.	51.
	1	12.	3.	7.	3.	195.	358.	59.	63.
	10	11.	7.	61.	62.	5942.	7513.	900.	995.
	100	7.	10.	6.	10.	5500.	3580.	178.	161.
KIDNEY									
	0	8.	6.	6.	3.	15.	16.	38.	42.
	1	13.	9.	6.	6.	39.	30.	33.	46.
	10	19.	13.	4.	9.	319.	626.	68.	92.
	100	3.	12.	42.	63.	3740.	3470.	360.	339.
BRAIN									
	0	3.	9.	4.	3.	21.	16.	32.	34.
	1	9.	4.	1.	2.	17.	24.	35.	36.
	10	3.	2.	6.	3.	114.	106.	36.	43.
	100	11.	6.	11.	6.	448.	406.	47.	39.
SPLEEN									
	0	3.	9.	3.	1.	13.	17.	127.	143.
	1	3.	4.	12.	14.	46.	37.	31.	37.
	10	7.	6.	32.	32.	230.	289.	128.	152.
	100	4.	6.	57.	119.	1034.	3268.	643.	1050.
LUNG									
	0	7.	7.	4.	7.	20.	19.	49.	46.
	1	13.	16.	4.	4.	18.	27.	34.	49.
	10	11.	12.	3.	4.	132.	102.	41.	83.
	100	4.	9.	11.	10.	992.	642.	63.	81.
STOMACH									
	0	5.	10.	3.	4.	20.	18.	50.	39.
	1	4.	6.	7.	7.	14.	19.	42.	93.
	10	10.	12.	2.	4.	78.	102.	29.	33.
	100	8.	7.	11.	10.	493.	823.	38.	72.
BLOOD									
	0	8.	10.	3.	5.	11.	18.	50.	34.
	1	9.	3.	4.	1.	18.	27.	33.	29.
	10	8.	5.	4.	13.	89.	90.	74.	39.
	100	6.	7.	22.	23.	390.	442.	53.	71.

3-Methylcholanthrene (C-13)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	4.	9.	5.	8.	19.	19.	0.	0.
	1	8.	11.	6.	2.	26.	25.	1.	1.
	10	7.	12.	4.	6.	13.	9.	1.	2.
	100	6.	6.	17.	17.	35.	29.	1.	0.
LIVER									
	0	19.	21.	10.	12.	24.	25.	1.	0.
	1	26.	16.	13.	9.	29.	26.	3.	1.
	10	9.	9.	31.	28.	47.	47.	2.	0.
	100	7.	13.	33.	60.	120.	87.	1.	1.
KIDNEY									
	0	25.	33.	13.	14.	34.	28.	1.	1.
	1	23.	30.	17.	19.	60.	38.	0.	1.
	10	17.	14.	30.	29.	27.	30.	3.	0.
	100	34.	14.	22.	23.	37.	40.	0.	2.
BRAIN									
	0	20.	13.	10.	6.	29.	18.	1.	1.
	1	28.	14.	6.	7.	17.	20.	0.	0.
	10	6.	9.	8.	9.	15.	17.	0.	0.
	100	12.	11.	16.	19.	29.	39.	0.	0.
SPLEEN									
	0	18.	19.	17.	17.	27.	16.	1.	0.
	1	11.	14.	13.	9.	38.	20.	1.	0.
	10	16.	8.	20.	16.	36.	25.	1.	0.
	100	10.	17.	22.	17.	38.	32.	0.	0.
LUNG									
	0	27.	15.	11.	12.	31.	27.	4.	2.
	1	12.	21.	14.	15.	11.	31.	6.	0.
	10	15.	24.	10.	14.	34.	26.	5.	2.
	100	6.	19.	13.	15.	40.	30.	1.	1.
STOMACH									
	0	17.	14.	8.	7.	24.	11.	1.	0.
	1	10.	8.	9.	5.	15.	13.	0.	0.
	10	15.	9.	6.	10.	20.	16.	2.	0.
	100	11.	19.	12.	11.	32.	22.	0.	0.
BLOOD									
	0	11.	14.	5.	6.	8.	10.	2.	0.
	1	7.	12.	4.	4.	15.	17.	2.	0.
	10	12.	5.	8.	4.	9.	14.	2.	2.
	100	5.	6.	15.	15.	22.	23.	1.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

22-Methylcholanthrene (C-56)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	2.	3.	3.	4.	0.	9.	92.	100.
	1	1.	1.	7.	4.	10.	19.	87.	90.
	10	4.	3.	3.	4.	10.	9.	102.	109.
	100	1.	4.	7.	9.	22.	18.	120.	130.
LIVER	0	5.	4.	4.	7.	17.	11.	112.	110.
	1	8.	4.	4.	3.	14.	11.	88.	113.
	10	3.	1.	12.	10.	60.	91.	130.	123.
	100	3.	4.	10.	16.	96.	98.	164.	121.
KIDNEY	0	3.	0.	3.	2.	0.	9.	92.	84.
	1	5.	9.	6.	8.	22.	19.	130.	131.
	10	9.	16.	8.	11.	23.	11.	129.	127.
	100	5.	5.	9.	4.	20.	16.	100.	123.
BRAIN	0	6.	5.	6.	7.	12.	12.	124.	133.
	1	4.	1.	5.	6.	9.	8.	116.	129.
	10	2.	3.	4.	5.	6.	12.	129.	133.
	100	4.	5.	13.	6.	16.	28.	144.	139.
SPLEEN	0	3.	9.	3.	1.	13.	17.	137.	143.
	1	1.	7.	9.	9.	18.	13.	123.	152.
	10	4.	8.	11.	12.	33.	32.	140.	148.
	100	8.	7.	14.	16.	42.	49.	300.	242.
LUNG	0	6.	5.	4.	2.	14.	11.	112.	123.
	1	4.	0.	4.	0.	15.	19.	112.	127.
	10	4.	3.	5.	7.	19.	12.	120.	118.
	100	9.	4.	3.	4.	16.	20.	130.	123.
STOMACH	0	1.	3.	1.	6.	12.	13.	80.	92.
	1	8.	10.	2.	1.	8.	10.	100.	85.
	10	4.	3.	3.	3.	10.	17.	120.	109.
	100	1.	2.	0.	9.	19.	20.	133.	141.
BLOOD	0	4.	0.	2.	1.	9.	10.	96.	72.
	1	7.	3.	5.	4.	11.	12.	80.	79.
	10	3.	3.	5.	6.	13.	9.	123.	109.
	100	1.	3.	2.	2.	5.	7.	84.	72.

N-Methylnitrosoguanidine (C-7)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	15.	9.	4.	3.	12.	7.	0.	0.
	1	425.	329.	4.	5.	11.	10.	0.	0.
	10	9820.	8020.	38.	47.	8.	9.	2.	0.
	100	90000.	90000.	1.	4.	4.	5.	0.	0.
LIVER	0	20.	12.	19.	11.	34.	31.	0.	0.
	1	15.	8.	10.	14.	23.	32.	0.	0.
	10	910.	652.	2.	17.	25.	24.	0.	0.
	100	108.	64.	23.	17.	16.	25.	0.	0.
KIDNEY	0	16.	14.	10.	8.	30.	15.	0.	0.
	1	1030.	1432.	8.	18.	24.	28.	1.	3.
	10	2490.	2100.	30.	37.	41.	28.	4.	5.
	100	147.	147.	935.	333.	207.	3.	0.	0.
BRAIN	0	13.	14.	30.	9.	49.	30.	0.	0.
	1	1440.	2000.	7.	7.	13.	13.	0.	0.
	10	10975.	17945.	29.	27.	17.	17.	0.	0.
	100	75.	69.	10.	20.	5.	5.	0.	0.
SPLEEN	0	15.	22.	4.	5.	22.	19.	1.	1.
	1	610.	508.	8.	2.	33.	14.	0.	0.
	10	9330.	12734.	26.	35.	19.	20.	1.	2.
	100	84.	69.	30.	40.	2.	4.	0.	0.
LUNG	0	4.	15.	7.	18.	17.	18.	0.	0.
	1	74.	439.	9.	19.	13.	15.	0.	0.
	10	44715.	48009.	27.	34.	25.	22.	1.	1.
	100	98.	60.	54.	25.	4.	3.	0.	0.
STOMACH	0	12.	12.	13.	0.	11.	14.	0.	0.
	1	294.	332.	5.	3.	17.	14.	0.	0.
	10	29920.	30000.	78.	93.	8.	17.	3.	1.
	100	55.	11.	88.	94.	11.	4.	0.	0.
BLOOD	0	10.	9.	6.	8.	8.	9.	0.	0.
	1	11.	6.	1.	7.	15.	19.	0.	0.
	10	7140.	6480.	14.	14.	70.	14.	3.	0.
	100	10000.	11432.	10.	14.	4.	10.	0.	0.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

N-Methylnitrosourea (C-34)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	13.	14.	4.	5.	17.	17.	10.	8.
	1	19.	10.	5.	5.	11.	9.	11.	6.
	10	14.	11.	2.	2.	10.	7.	11.	8.
	100	2035.	1265.	8.	6.	12.	12.	1070.	1475.
LIVER									
	0	17.	12.	11.	5.	25.	25.	11.	25.
	1	14.	15.	6.	8.	19.	21.	19.	17.
	10	5.	12.	2.	11.	11.	22.	19.	17.
	100	807.	1760.	7.	13.	8.	20.	990.	440.
KIDNEY									
	0	37.	28.	12.	7.	18.	20.	13.	24.
	1	15.	20.	9.	12.	25.	14.	22.	22.
	10	24.	11.	10.	8.	30.	24.	35.	26.
	100	1728.	2475.	16.	17.	30.	25.	1210.	2475.
BRAIN									
	0	22.	11.	3.	8.	18.	19.	11.	11.
	1	14.	11.	1.	8.	16.	20.	13.	16.
	10	9.	15.	5.	4.	16.	21.	12.	8.
	100	1375.	1045.	7.	2.	12.	12.	1430.	990.
SPLEEN									
	0	10.	14.	8.	1.	21.	32.	10.	12.
	1	20.	13.	3.	4.	21.	20.	14.	10.
	10	24.	17.	11.	5.	30.	15.	12.	29.
	100	1555.	770.	6.	2.	25.	21.	770.	440.
LUNG									
	0	10.	14.	8.	1.	15.	29.	8.	13.
	1	16.	9.	6.	8.	15.	19.	10.	11.
	10	6.	10.	1.	9.	19.	16.	12.	10.
	100	2145.	1650.	1.	4.	17.	14.	605.	605.
STOMACH									
	0	11.	17.	8.	5.	16.	20.	9.	18.
	1	7.	6.	4.	7.	20.	17.	13.	10.
	10	20.	5.	6.	5.	17.	14.	18.	16.
	100	632.	4290.	6.	8.	10.	22.	2090.	1705.
BLOOD									
	0	10.	5.	6.	3.	10.	13.	11.	9.
	1	5.	11.	4.	6.	15.	11.	12.	10.
	10	9.	9.	3.	4.	11.	23.	5.	12.
	100	550.	640.	7.	10.	21.	17.	490.	560.

β-Naphthylamine (C-12)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	4.	2.	7.	9.	36.	24.	0.	0.
	1	19.	20.	15.	2.	50.	28.	0.	0.
	10	20.	22.	8.	8.	34.	39.	1.	1.
	100	27.	50.	13.	12.	29.	24.	0.	0.
LIVER									
	0	25.	51.	12.	9.	59.	27.	3.	0.
	1	130.	89.	9.	12.	49.	53.	0.	0.
	10	1100.	932.	19.	25.	60.	59.	1.	2.
	100	668.	688.	23.	10.	83.	67.	0.	0.
KIDNEY									
	0	38.	37.	19.	21.	58.	32.	1.	1.
	1	43.	29.	12.	12.	49.	47.	0.	0.
	10	61.	29.	20.	11.	55.	64.	0.	2.
	100	36.	52.	14.	12.	54.	37.	0.	0.
BRAIN									
	0	18.	13.	9.	10.	31.	70.	0.	0.
	1	21.	20.	11.	5.	24.	57.	0.	0.
	10	27.	18.	9.	8.	44.	38.	0.	0.
	100	11.	15.	17.	5.	39.	51.	0.	0.
SPLEEN									
	0	39.	47.	7.	9.	45.	40.	0.	0.
	1	38.	19.	8.	12.	38.	30.	0.	0.
	10	29.	25.	8.	19.	17.	67.	0.	2.
	100	47.	37.	6.	4.	36.	27.	0.	0.
LUNG									
	0	38.	51.	5.	12.	56.	48.	0.	0.
	1	22.	36.	10.	9.	61.	44.	0.	0.
	10	42.	80.	10.	5.	54.	39.	13.	0.
	100	120.	222.	6.	10.	51.	48.	1.	1.
STOMACH									
	0	29.	41.	3.	7.	40.	42.	0.	0.
	1	27.	21.	8.	7.	47.	37.	0.	0.
	10	23.	23.	5.	9.	50.	29.	0.	0.
	100	19.	40.	0.	0.	34.	44.	0.	0.
BLOOD									
	0	20.	24.	5.	5.	24.	40.	0.	0.
	1	19.	18.	2.	3.	31.	28.	0.	0.
	10	11.	16.	8.	8.	32.	26.	0.	0.
	100	13.	15.	8.	6.	35.	35.	0.	0.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Natulan Hydrochloride (C-48)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	4.	5.	9.	9.	19.	6.	149.	122.
	1	11.	2.	6.	9.	22.	8.	240.	264.
	10	12.	2.	3.	4.	21.	14.	272.	226.
	100	11.	7.	6.	9.	16.	23.	204.	210.
LIVER									
	0	10.	10.	4.	7.	24.	11.	254.	202.
	1	11.	11.	10.	13.	37.	30.	236.	200.
	10	6.	3.	9.	10.	50.	45.	194.	272.
	100	13.	3.	13.	11.	75.	90.	274.	292.
KIDNEY									
	0	10.	3.	7.	9.	14.	21.	138.	197.
	1	13.	13.	9.	9.	17.	21.	260.	303.
	10	16.	10.	18.	9.	21.	19.	312.	217.
	100	9.	15.	9.	13.	32.	22.	200.	240.
BRAIN									
	0	3.	6.	9.	2.	10.	17.	147.	163.
	1	13.	17.	7.	11.	12.	15.	230.	279.
	10	16.	13.	6.	6.	21.	33.	224.	200.
	100	13.	8.	8.	4.	29.	26.	263.	243.
SPLEEN									
	0	7.	15.	9.	10.	11.	22.	180.	240.
	1	6.	14.	10.	15.	29.	35.	264.	262.
	10	18.	14.	11.	3.	40.	42.	304.	280.
	100	11.	10.	3.	4.	24.	24.	326.	304.
LUNG									
	0	7.	7.	4.	5.	12.	13.	141.	140.
	1	14.	17.	8.	9.	19.	19.	290.	274.
	10	12.	14.	4.	8.	26.	20.	280.	254.
	100	14.	10.	9.	7.	19.	21.	236.	282.
STOMACH									
	0	11.	11.	6.	7.	9.	14.	102.	103.
	1	8.	13.	8.	7.	19.	25.	290.	280.
	10	9.	6.	9.	6.	20.	27.	294.	310.
	100	17.	11.	8.	9.	13.	19.	230.	240.
BLOOD									
	0	6.	5.	7.	4.	12.	10.	213.	194.
	1	9.	13.	6.	8.	26.	21.	290.	304.
	10	16.	12.	13.	7.	25.	23.	298.	304.
	100	5.	6.	11.	6.	33.	25.	316.	294.

4-Nitrobiphenyl (C-11)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	2.	4.	10.	10.	7.	7.	0.	0.
	1	6.	8.	4.	7.	4.	20.	0.	0.
	10	4.	11.	10.	10.	3.	44.	0.	0.
	100	3.	1.	0.	0.	0.	0.	0.	0.
LIVER									
	0	1.	9.	5.	9.	14.	34.	0.	0.
	1	2.	5.	10.	1.	48.	91.	2.	0.
	10	12.	4.	10.	14.	220.	225.	0.	0.
	100	8.	7.	2.	30.	412.	320.	0.	0.
KIDNEY									
	0	9.	7.	14.	10.	26.	14.	1.	0.
	1	17.	15.	10.	10.	40.	34.	0.	0.
	10	13.	27.	22.	17.	81.	55.	0.	2.
	100	20.	9.	20.	47.	177.	165.	0.	0.
BRAIN									
	0	12.	12.	7.	4.	32.	99.	0.	0.
	1	7.	11.	2.	2.	21.	22.	0.	0.
	10	13.	10.	11.	15.	80.	70.	0.	0.
	100	0.	10.	0.	0.	174.	64.	0.	0.
SPLEEN									
	0	6.	14.	11.	10.	12.	10.	0.	1.
	1	3.	10.	11.	0.	30.	35.	0.	0.
	10	8.	18.	7.	6.	75.	67.	0.	0.
	100	10.	10.	90.	48.	147.	167.	0.	0.
LUNG									
	0	5.	1.	0.	7.	11.	19.	0.	1.
	1	10.	10.	4.	6.	—	—	0.	0.
	10	8.	10.	3.	13.	36.	30.	0.	0.
	100	11.	7.	12.	23.	109.	114.	0.	0.
STOMACH									
	0	0.	6.	10.	7.	27.	24.	0.	0.
	1	10.	9.	7.	4.	31.	25.	1.	1.
	10	7.	5.	14.	10.	90.	121.	0.	0.
	100	2.	4.	8.	2.	103.	312.	0.	0.
BLOOD									
	0	3.	6.	3.	4.	23.	10.	0.	0.
	1	15.	10.	6.	4.	32.	10.	0.	0.
	10	7.	7.	9.	4.	22.	20.	0.	0.
	100	4.	1.	12.	9.	92.	65.	0.	0.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

2-Nitrofluorene (C-3)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	12.	11.	10.	4.	11.	13.	0.	0.
	1	12.	15.	25.	28.	187.	198.	0.	0.
	10	13.	8.	154.	142.	2100.	1918.	2.	0.
	100	16.	17.	3.	3.	4032.	3808.	0.	0.
LIVER									
	0	11.	23.	14.	5.	34.	28.	2.	1.
	1	20.	29.	56.	58.	464.	452.	1.	2.
	10	42.	57.	201.	172.	2142.	2310.	0.	0.
	100	171.	128.	38.	28.	298.	231.	33.	34.
KIDNEY									
	0	36.	30.	11.	15.	24.	25.	2.	0.
	1	32.	26.	81.	82.	1176.	1414.	2.	0.
	10	38.	34.	918.	406.	3332.	3192.	0.	2.
	100	54.	34.	1.	3.	3976.	4648.	0.	0.
BRAIN									
	0	27.	16.	4.	6.	20.	21.	1.	0.
	1	23.	19.	92.	24.	464.	303.	1.	0.
	10	27.	27.	243.	219.	2086.	1520.	0.	0.
	100	30.	43.	0.	0.	3596.	4208.	0.	0.
SPLEEN									
	0	13.	10.	15.	11.	19.	19.	2.	1.
	1	22.	22.	25.	22.	201.	228.	0.	5.
	10	43.	32.	168.	147.	2695.	1815.	2.	0.
	100	41.	36.	3.	6.	2310.	2142.	0.	0.
LUNG									
	0	31.	35.	9.	7.	35.	33.	1.	0.
	1	13.	10.	25.	31.	340.	427.	0.	0.
	10	16.	21.	196.	207.	2282.	2516.	0.	0.
	100	36.	24.	7.	5.	4345.	3630.	0.	0.
STOMACH									
	0	17.	14.	3.	11.	14.	16.	0.	0.
	1	32.	24.	86.	64.	507.	752.	0.	0.
	10	49.	31.	274.	252.	5995.	13970.	0.	0.
	100	33.	34.	0.	0.	6552.	5002.	0.	1.
BLOOD									
	0	11.	13.	7.	5.	24.	18.	0.	0.
	1	18.	9.	17.	14.	70.	59.	0.	0.
	10	15.	12.	54.	57.	758.	438.	0.	0.
	100	21.	17.	266.	295.	2145.	1248.	0.	0.

Nitrogen Mustard Hydrochloride (C-43)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	8.	8.	11.	6.	19.	17.	308.	316.
	1	7.	10.	4.	5.	17.	19.	249.	223.
	10	3.	15.	8.	10.	15.	18.	266.	275.
	100	92.	83.	5.	2.	17.	15.	325.	369.
LIVER									
	0	6.	9.	12.	6.	61.	47.	381.	338.
	1	13.	17.	2.	5.	21.	13.	277.	243.
	10	19.	1.	5.	7.	25.	21.	319.	269.
	100	278.	238.	9.	9.	1.	4.	341.	342.
KIDNEY									
	0	19.	13.	20.	15.	30.	38.	340.	414.
	1	23.	13.	11.	13.	28.	28.	275.	300.
	10	23.	28.	8.	7.	33.	22.	330.	380.
	100	188.	170.	5.	22.	23.	27.	374.	389.
BRAIN									
	0	12.	9.	9.	5.	22.	32.	266.	310.
	1	5.	4.	3.	6.	29.	23.	380.	216.
	10	25.	49.	8.	9.	16.	23.	349.	290.
	100	106.	112.	5.	9.	19.	28.	353.	328.
SPLEEN									
	0	9.	10.	9.	4.	25.	17.	327.	331.
	1	6.	8.	4.	3.	25.	7.	173.	179.
	10	3.	5.	10.	5.	21.	30.	197.	186.
	100	2.	2.	2.	4.	12.	17.	299.	247.
LUNG									
	0	7.	12.	11.	1.	20.	26.	354.	320.
	1	8.	6.	4.	4.	18.	28.	389.	216.
	10	36.	41.	87.	137.	23.	16.	348.	321.
	100	79.	118.	7.	8.	28.	20.	374.	359.
STOMACH									
	0	17.	21.	15.	17.	21.	22.	349.	287.
	1	3.	2.	3.	4.	2.	41.	272.	264.
	10	17.	31.	9.	8.	14.	30.	240.	440.
	100	120.	154.	8.	4.	23.	22.	385.	371.
BLOOD									
	0	5.	9.	6.	8.	15.	11.	258.	286.
	1	8.	7.	8.	11.	10.	5.	352.	230.
	10	20.	75.	13.	10.	19.	16.	288.	273.
	100	164.	129.	10.	8.	14.	13.	366.	337.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens (Revertant Colonies per Plate; Duplicate Plates)

4-Nitroquinoline-N-oxide (C-2)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	6.	2.	11.	12.	14.	11.	0.	0.
	1	3.	8.	15.	23.	10.	25.	0.	0.
	10	0.	0.	0.	0.	0.	0.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LIVER	0	6.	11.	17.	25.	20.	30.	0.	0.
	1	34.	18.	18.	22.	52.	85.	0.	0.
	10	107.	111.	22.	25.	230.	219.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
KIDNEY	0	24.	30.	19.	16.	27.	23.	0.	0.
	1	25.	27.	25.	16.	103.	110.	1.	1.
	10	41.	49.	9.	15.	251.	304.	6.	18.
	100	0.	0.	0.	0.	0.	0.	0.	0.
BRAIN	0	20.	20.	12.	6.	18.	13.	0.	0.
	1	10.	20.	[illegible]	6.	61.	69.	0.	0.
	10	13.	4.	2.	2.	20.	90.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
SPLEEN	0	19.	20.	4.	16.	20.	14.	0.	0.
	1	4.	12.	11.	13.	42.	35.	0.	0.
	10	59.	72.	8.	9.	115.	109.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
LUNG	0	11.	5.	4.	9.	10.	7.	0.	0.
	1	11.	12.	92.	56.	76.	93.	7.	3.
	10	4.	22.	7.	4.	230.	185.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
STOMACH	0	6.	9.	10.	10.	9.	14.	0.	0.
	1	8.	10.	9.	6.	42.	82.	0.	2.
	10	0.	10.	0.	0.	93.	45.	0.	0.
	100	0.	0.	0.	0.	0.	0.	0.	0.
BLOOD	0	5.	5.	4.	6.	10.	8.	0.	0.
	1	4.	16.	7.	7.	26.	24.	0.	0.
	10	11.	40.	7.	6.	80.	77.	4.	2.
	100	0.	0.	0.	0.	0.	0.	0.	0.

N-Nitrosodiethylamine (C-30)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	4.	5.	4.	4.	14.	9.	0.	0.
	1	3.	8.	6.	1.	8.	10.	0.	0.
	10	13.	9.	2.	3.	4.	16.	0.	1.
	100	9.	12.	4.	3.	10.	4.	0.	0.
LIVER	0	9.	8.	11.	4.	20.	30.	3.	3.
	1	15.	11.	8.	3.	17.	22.	3.	4.
	10	10.	14.	4.	7.	16.	18.	0.	1.
	100	11.	10.	7.	2.	15.	24.	0.	0.
KIDNEY	0	18.	13.	18.	24.	4.	24.	0.	1.
	1	14.	10.	6.	7.	17.	15.	0.	0.
	10	8.	10.	10.	8.	13.	16.	1.	0.
	100	20.	20.	7.	11.	18.	10.	1.	1.
BRAIN	0	14.	29.	6.	7.	14.	35.	0.	0.
	1	17.	11.	4.	6.	14.	14.	1.	2.
	10	7.	12.	7.	9.	14.	24.	4.	4.
	100	10.	20.	4.	4.	9.	12.	0.	0.
SPLEEN	0	6.	18.	5.	10.	10.	15.	0.	0.
	1	9.	10.	7.	5.	16.	27.	0.	0.
	10	0.	0.	2.	2.	10.	12.	0.	0.
	100	10.	6.	3.	3.	24.	21.	0.	0.
LUNG	0	6.	9.	11.	5.	14.	12.	1.	1.
	1	16.	10.	2.	3.	14.	14.	0.	1.
	10	10.	10.	5.	6.	13.	24.	0.	0.
	100	12.	15.	2.	6.	11.	17.	2.	0.
STOMACH	0	10.	10.	3.	3.	22.	14.	0.	0.
	1	10.	16.	5.	3.	16.	20.	0.	0.
	10	10.	10.	3.	5.	15.	8.	0.	0.
	100	10.	11.	2.	13.	13.	13.	0.	0.
BLOOD	0	5.	8.	5.	10.	8.	13.	2.	0.
	1	6.	8.	0.	8.	7.	12.	0.	1.
	10	6.	3.	4.	3.	8.	13.	0.	1.
	100	5.	4.	0.	0.	8.	14.	0.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

N-Nitrosodimethylamine (C-27)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	10.	12.	20.	9.	11.	14.	1.	0.
	1	8.	8.	13.	13.	13.	19.	1.	1.
	10	18.	–	10.	13.	17.	9.	0.	0.
	100	12.	8.	17.	18.	22.	23.	0.	0.
LIVER									
	0	8.	9.	23.	18.	32.	31.	2.	2.
	1	5.	7.	33.	14.	24.	19.	1.	1.
	10	7.	9.	8.	24.	33.	16.	2.	0.
	100	3.	12.	14.	15.	34.	23.	2.	0.
KIDNEY									
	0	12.	16.	20.	15.	30.	26.	0.	2.
	1	10.	–	29.	20.	26.	26.	1.	1.
	10	4.	6.	19.	10.	34.	21.	1.	0.
	100	11.	7.	22.	14.	29.	26.	0.	0.
BRAIN									
	0	13.	7.	21.	21.	10.	23.	0.	0.
	1	6.	20.	11.	24.	11.	18.	0.	1.
	10	12.	15.	18.	23.	20.	21.	0.	0.
	100	11.	9.	17.	18.	26.	21.	0.	0.
SPLEEN									
	0	12.	9.	18.	26.	28.	25.	0.	1.
	1	13.	8.	12.	20.	27.	23.	1.	0.
	10	6.	10.	18.	27.	21.	35.	0.	0.
	100	9.	12.	11.	24.	23.	19.	1.	0.
LUNG									
	0	18.	13.	30.	15.	24.	18.	0.	1.
	1	9.	13.	20.	12.	21.	21.	1.	1.
	10	3.	13.	16.	16.	28.	24.	1.	0.
	100	6.	12.	21.	21.	15.	18.	0.	2.
STOMACH									
	0	19.	12.	13.	15.	25.	21.	0.	0.
	1	10.	17.	17.	22.	17.	24.	2.	2.
	10	12.	10.	13.	23.	12.	27.	0.	0.
	100	10.	6.	16.	22.	17.	20.	0.	1.
BLOOD									
	0	6.	10.	16.	16.	29.	24.	1.	0.
	1	9.	8.	14.	19.	22.	34.	0.	1.
	10	7.	3.	18.	9.	17.	18.	3.	0.
	100	5.	6.	15.	19.	21.	12.	0.	2.

Propane Sultone (C-44)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE									
	0	8.	13.	5.	9.	16.	29.	223.	238.
	1	94.	38.	5.	15.	13.	15.	155.	187.
	10	400.	370.	5.	7.	15.	25.	635.	900.
	100	5000.	6210.	17.	4.	22.	23.	4300.	5100.
LIVER									
	0	7.	9.	10.	8.	46.	33.	232.	251.
	1	83.	89.	12.	7.	57.	63.	193.	226.
	10	728.	647.	13.	8.	41.	39.	770.	520.
	100	7200.	8445.	8.	9.	33.	53.	1680.	2125.
KIDNEY									
	0	17.	8.	17.	13.	43.	51.	244.	201.
	1	70.	60.	21.	17.	1.	1.	353.	298.
	10	4235.	1790.	13.	14.	25.	23.	475.	693.
	100	6000.	5700.	15.	23.	37.	59.	2090.	3460.
BRAIN									
	0	11.	13.	5.	5.	31.	27.	172.	179.
	1	63.	72.	11.	15.	31.	64.	257.	293.
	10	400.	760.	11.	11.	40.	36.	6600.	5170.
	100	2200.	2040.	10.	12.	31.	16.	3465.	4015.
SPLEEN									
	0	9.	16.	7.	13.	34.	38.	284.	238.
	1	42.	61.	15.	20.	42.	39.	127.	212.
	10	465.	230.	19.	5.	36.	28.	293.	340.
	100	3550.	5100.	18.	8.	32.	37.	3300.	2950.
LUNG									
	0	13.	4.	7.	13.	27.	36.	200.	285.
	1	12.	65.	5.	11.	33.	13.	165.	182.
	10	237.	226.	5.	1.	20.	23.	612.	1190.
	100	3575.	4675.	8.	15.	18.	14.	2310.	5500.
STOMACH									
	0	9.	16.	11.	0.	5.	19.	159.	182.
	1	72.	61.	4.	13.	17.	25.	212.	193.
	10	2195.	1400.	5.	4.	20.	27.	1080.	755.
	100	4900.	5230.	7.	6.	12.	25.	6100.	4975.
BLOOD									
	0	17.	9.	12.	15.	21.	18.	149.	198.
	1	25.	15.	7.	11.	19.	39.	195.	218.
	10	7.	5.	17.	10.	15.	18.	285.	227.
	100	4955.	5367.	17.	11.	15.	20.	4028.	5115.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

β-Propiolactone (C-26)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	2.	17.	6.	11.	8.	15.	0.	0.
	1	31.	29.	8.	4.	8.	8.	0.	0.
	10	990.	823.	9.	7.	5.	1.	0.	0.
	100	3850.	3025.	6.	5.	2.	0.	0.	0.
LIVER	0	19.	14.	23.	14.	19.	30.	0.	0.
	1	68.	55.	16.	9.	18.	18.	0.	0.
	10	880.	935.	9.	11.	19.	17.	0.	1.
	100	4035.	3308.	7.	3.	20.	20.	1.	0.
KIDNEY	0	20.	28.	18.	13.	28.	36.	1.	0.
	1	109.	99.	11.	14.	0.	1.	0.	0.
	10	1705.	1265.	9.	14.	17.	28.	1.	0.
	100	4620.	6270.	15.	24.	30.	15.	1.	0.
BRAIN	0	14.	13.	12.	13.	24.	15.	0.	0.
	1	68.	57.	16.	9.	11.	23.	0.	0.
	10	950.	770.	14.	7.	15.	19.	0.	0.
	100	5535.	3955.	10.	14.	14.	13.	0.	1.
SPLEEN	0	17.	24.	8.	11.	19.	25.	0.	0.
	1	64.	77.	8.	16.	17.	17.	0.	0.
	10	923.	1870.	7.	9.	15.	19.	1.	0.
	100	8395.	6930.	4.	12.	20.	15.	0.	0.
LUNG	0	15.	13.	10.	10.	17.	18.	0.	0.
	1	26.	25.	9.	14.	21.	16.	0.	0.
	10	880.	825.	5.	10.	12.	13.	0.	1.
	100	4180.	6225.	11.	6.	15.	23.	1.	0.
STOMACH	0	12.	11.	7.	7.	13.	14.	0.	0.
	1	52.	40.	6.	10.	14.	18.	0.	0.
	10	880.	1100.	4.	8.	16.	20.	0.	0.
	100	1210.	5495.	10.	8.	18.	19.	0.	0.
BLOOD	0	8.	7.	10.	8.	14.	15.	0.	0.
	1	90.	59.	7.	12.	12.	17.	0.	0.
	10	640.	880.	7.	11.	13.	13.	0.	0.
	100	4345.	4235.	7.	13.	11.	17.	0.	0.

Safrole (C-10)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	7.	4.	1.	5.	10.	14.	0.	0.
	1	4.	9.	3.	2.	10.	19.	1.	0.
	10	7.	9.	8.	7.	12.	10.	0.	0.
	100	6.	6.	6.	2.	6.	15.	0.	1.
LIVER	0	3.	17.	7.	4.	22.	13.	0.	1.
	1	6.	10.	7.	13.	17.	29.	0.	0.
	10	12.	8.	7.	4.	12.	30.	1.	0.
	100	11.	10.	7.	12.	14.	23.	1.	0.
KIDNEY	0	10.	6.	16.	19.	23.	24.	0.	1.
	1	9.	10.	16.	9.	22.	23.	4.	2.
	10	8.	5.	3.	3.	12.	16.	3.	0.
	100	15.	20.	26.	17.	25.	29.	3.	0.
BRAIN	0	12.	10.	9.	5.	16.	23.	1.	0.
	1	11.	26.	1.	9.	12.	18.	0.	0.
	10	10.	8.	4.	5.	15.	20.	1.	1.
	100	13.	16.	6.	4.	13.	13.	0.	0.
SPLEEN	0	16.	12.	5.	4.	21.	23.	0.	0.
	1	8.	6.	3.	4.	16.	22.	0.	0.
	10	7.	8.	8.	3.	18.	20.	0.	0.
	100	9.	12.	6.	7.	20.	22.	2.	2.
LUNG	0	8.	10.	2.	7.	17.	12.	0.	2.
	1	9.	7.	5.	7.	17.	23.	1.	0.
	10	15.	9.	9.	7.	12.	17.	0.	0.
	100	14.	10.	8.	4.	16.	15.	0.	2.
STOMACH	0	15.	8.	6.	11.	18.	12.	1.	1.
	1	7.	9.	4.	5.	13.	22.	0.	0.
	10	13.	17.	3.	7.	16.	17.	0.	0.
	100	11.	15.	5.	10.	15.	13.	0.	0.
BLOOD	0	6.	6.	6.	4.	9.	10.	0.	1.
	1	2.	1.	0.	0.	8.	18.	2.	-1.
	10	3.	6.	7.	6.	15.	14.	0.	1.
	100	6.	4.	5.	8.	15.	14.	3.	3.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

Thioacetamide (C-28)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	10.	15.	4.	9.	15.	14.	0.	0.
	1	11.	7.	3.	4.	8.	7.	0.	0.
	10	14.	4.	5.	3.	11.	10.	0.	0.
	100	10.	9.	5.	3.	4.	3.	0.	0.
LIVER									
	0	10.	13.	4.	5.	17.	17.	0.	0.
	1	6.	7.	9.	7.	15.	7.	5.	2.
	10	9.	8.	4.	4.	13.	22.	0.	1.
	100	6.	6.	4.	4.	23.	19.	1.	1.
KIDNEY									
	0	26.	24.	15.	20.	35.	41.	0.	0.
	1	19.	15.	7.	12.	30.	20.	0.	0.
	10	18.	22.	8.	8.	42.	42.	0.	0.
	100	21.	15.	16.	9.	23.	35.	0.	0.
BRAIN									
	0	16.	10.	20.	8.	16.	14.	0.	0.
	1	8.	12.	4.	2.	15.	8.	0.	0.
	10	9.	13.	8.	5.	14.	17.	0.	0.
	100	18.	10.	6.	3.	13.	13.	0.	0.
SPLEEN									
	0	6.	5.	12.	10.	16.	11.	2.	0.
	1	9.	13.	7.	5.	22.	16.	0.	0.
	10	4.	8.	10.	9.	19.	19.	0.	0.
	100	8.	8.	11.	9.	23.	20.	0.	0.
LUNG									
	0	6.	15.	5.	7.	12.	19.	0.	0.
	1	5.	14.	7.	6.	15.	19.	0.	0.
	10	14.	14.	5.	5.	13.	13.	0.	0.
	100	15.	16.	6.	7.	18.	6.	0.	0.
STOMACH									
	0	15.	15.	5.	5.	17.	17.	0.	0.
	1	3.	5.	6.	3.	20.	12.	0.	0.
	10	7.	12.	8.	5.	12.	12.	0.	0.
	100	9.	8.	9.	9.	9.	12.	0.	0.
BLOOD									
	0	3.	4.	4.	5.	16.	12.	0.	0.
	1	2.	3.	6.	4.	13.	12.	0.	0.
	10	5.	8.	3.	6.	16.	16.	0.	0.
	100	5.	6.	4.	3.	6.	14.	0.	0.

o-Tolidine (C-9)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE									
	0	11.	6.	7.	2.	5.	5.	0.	0.
	1	7.	4.	3.	6.	6.	4.	0.	0.
	10	6.	2.	3.	4.	11.	5.	0.	0.
	100	5.	10.	4.	9.	13.	9.	0.	3.
LIVER									
	0	11.	13.	1.	9.	19.	16.	0.	0.
	1	8.	8.	12.	6.	39.	36.	0.	0.
	10	31.	9.	6.	13.	55.	67.	5.	1.
	100	9.	10.	8.	6.	83.	77.	4.	3.
KIDNEY									
	0	18.	8.	20.	11.	18.	21.	0.	0.
	1	23.	11.	11.	14.	24.	24.	0.	0.
	10	19.	8.	7.	14.	31.	17.	0.	0.
	100	9.	7.	8.	12.	24.	25.	0.	2.
BRAIN									
	0	29.	18.	6.	7.	17.	6.	2.	1.
	1	24.	28.	9.	7.	14.	17.	0.	0.
	10	17.	24.	8.	1.	7.	16.	0.	0.
	100	28.	17.	6.	7.	14.	12.	0.	0.
SPLEEN									
	0	22.	12.	5.	8.	8.	13.	0.	0.
	1	18.	11.	9.	6.	15.	15.	0.	0.
	10	17.	23.	11.	6.	14.	10.	0.	0.
	100	16.	13.	7.	4.	21.	12.	0.	0.
LUNG									
	0	12.	13.	6.	10.	10.	23.	0.	0.
	1	4.	9.	8.	6.	15.	16.	2.	0.
	10	16.	12.	6.	6.	8.	10.	0.	0.
	100	18.	14.	9.	8.	9.	13.	0.	0.
STOMACH									
	0	27.	18.	5.	11.	13.	13.	0.	0.
	1	16.	19.	10.	11.	11.	15.	0.	0.
	10	18.	19.	8.	3.	14.	22.	2.	0.
	100	12.	10.	2.	4.	16.	11.	0.	0.
BLOOD									
	0	8.	12.	5.	8.	6.	8.	0.	0.
	1	6.	4.	9.	9.	9.	15.	0.	0.
	10	12.	9.	7.	7.	13.	17.	1.	0.
	100	5.	13.	6.	5.	15.	8.	1.	1.

APPENDIX B-2 (Continued)

Results of Salmonella Test on Presumptive Carcinogens
(Revertant Colonies per Plate; Duplicate Plates)

4-(o-Tolyazo)-o-toluidine (C-8)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 1536	
NONE	0	29.	17.	4.	6.	14.	13.	2.	0.
	1	13.	13.	2.	8.	11.	3.	0.	0.
	10	15.	26.	7.	2.	8.	10.	0.	0.
	100	13.	17.	3.	3.	10.	11.	0.	0.
LIVER	0	9.	9.	4.	7.	20.	25.	1.	0.
	1	9.	15.	2.	3.	12.	14.	0.	0.
	10	33.	69.	3.	5.	136.	140.	0.	0.
	100	10.	16.	7.	9.	365.	360.	0.	0.
KIDNEY	0	12.	6.	13.	9.	22.	37.	0.	0.
	1	17.	34.	16.	15.	31.	29.	3.	3.
	10	23.	21.	7.	11.	24.	20.	0.	0.
	100	19.	17.	14.	13.	20.	25.	0.	0.
BRAIN	0	5.	6.	5.	9.	11.	22.	0.	0.
	1	13.	21.	4.	8.	20.	25.	0.	0.
	10	15.	17.	6.	5.	18.	13.	0.	0.
	100	10.	29.	2.	6.	24.	10.	0.	0.
SPLEEN	0	14.	10.	15.	2.	19.	24.	0.	0.
	1	10.	14.	10.	5.	22.	21.	4.	1.
	10	14.	22.	7.	7.	23.	32.	1.	1.
	100	27.	15.	7.	8.	26.	16.	0.	0.
LUNG	0	6.	9.	3.	7.	20.	15.	0.	0.
	1	11.	12.	15.	9.	17.	12.	2.	1.
	10	13.	16.	0.	4.	25.	32.	0.	0.
	100	14.	9.	3.	7.	39.	22.	0.	0.
STOMACH	0	12.	8.	8.	4.	27.	14.	1.	1.
	1	9.	7.	6.	14.	21.	19.	4.	2.
	10	15.	23.	6.	0.	32.	22.	3.	4.
	100	23.	13.	2.	8.	10.	31.	1.	4.
BLOOD	0	5.	10.	2.	7.	20.	15.	1.	1.
	1	8.	9.	7.	10.	10.	24.	0.	0.
	10	10.	7.	11.	9.	23.	23.	1.	0.
	100	15.	14.	6.	5.	10.	14.	1.	0.

Uracil Mustard (C-41)

TISSUE	CONCENTRATION	TA 1535		TA 1537		TA 1538		TA 100	
NONE	0	4.	7.	12.	6.	19.	15.	244.	162.
	1	6.	11.	2.	1.	11.	11.	202.	180.
	10	8.	14.	3.	7.	14.	8.	290.	214.
	100	66.	46.	6.	4.	11.	8.	248.	206.
LIVER	0	9.	13.	16.	11.	29.	25.	206.	307.
	1	10.	11.	8.	5.	19.	34.	296.	392.
	10	20.	27.	6.	11.	10.	13.	298.	303.
	100	94.	99.	6.	9.	16.	25.	318.	456.
KIDNEY	0	10.	16.	17.	8.	29.	28.	282.	398.
	1	20.	15.	8.	16.	38.	30.	354.	307.
	10	26.	27.	11.	12.	27.	27.	238.	213.
	100	171.	154.	13.	11.	33.	25.	348.	308.
BRAIN	0	4.	4.	9.	5.	19.	18.	249.	266.
	1	5.	5.	6.	5.	17.	17.	276.	268.
	10	11.	13.	5.	6.	28.	18.	293.	198.
	100	81.	59.	8.	6.	32.	25.	384.	412.
SPLEEN	0	11.	13.	3.	3.	17.	33.	197.	142.
	1	17.	5.	10.	14.	90.	24.	328.	250.
	10	26.	18.	9.	11.	21.	21.	242.	298.
	100	61.	92.	3.	7.	28.	24.	318.	446.
LUNG	0	8.	2.	5.	7.	29.	20.	346.	307.
	1	3.	12.	8.	6.	16.	18.	201.	196.
	10	22.	10.	3.	6.	18.	10.	213.	231.
	100	111.	77.	10.	3.	24.	19.	297.	261.
STOMACH	0	9.	7.	0.	11.	19.	22.	294.	260.
	1	8.	10.	8.	5.	30.	18.	196.	187.
	10	21.	11.	8.	4.	28.	23.	239.	219.
	100	67.	103.	6.	5.	18.	21.	272.	292.
BLOOD	0	4.	9.	0.	6.	21.	27.	278.	251.
	1	5.	7.	4.	4.	25.	24.	328.	297.
	10	23.	24.	9.	8.	21.	16.	336.	331.
	100	80.	86.	5.	3.	14.	18.	362.	357.